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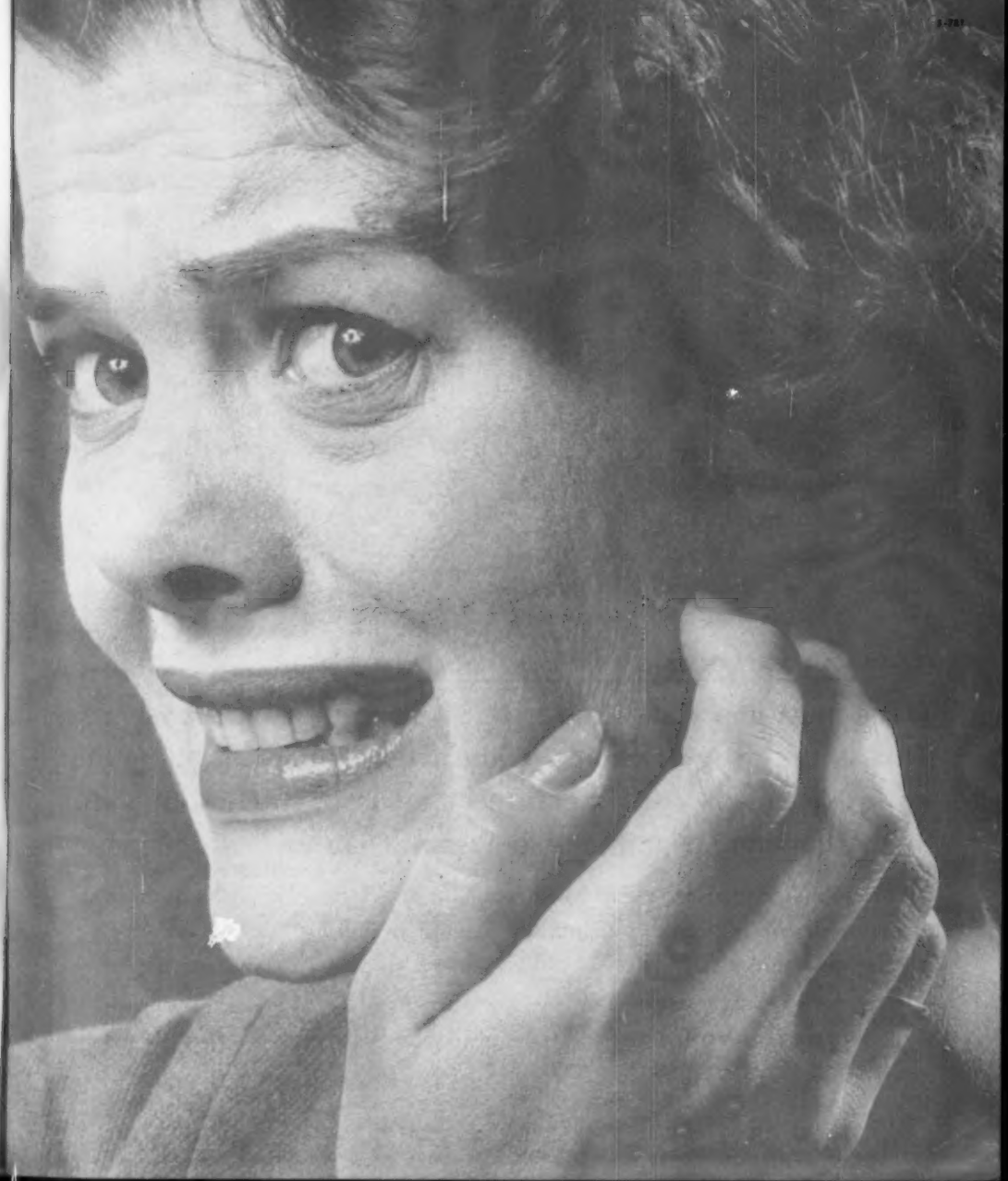

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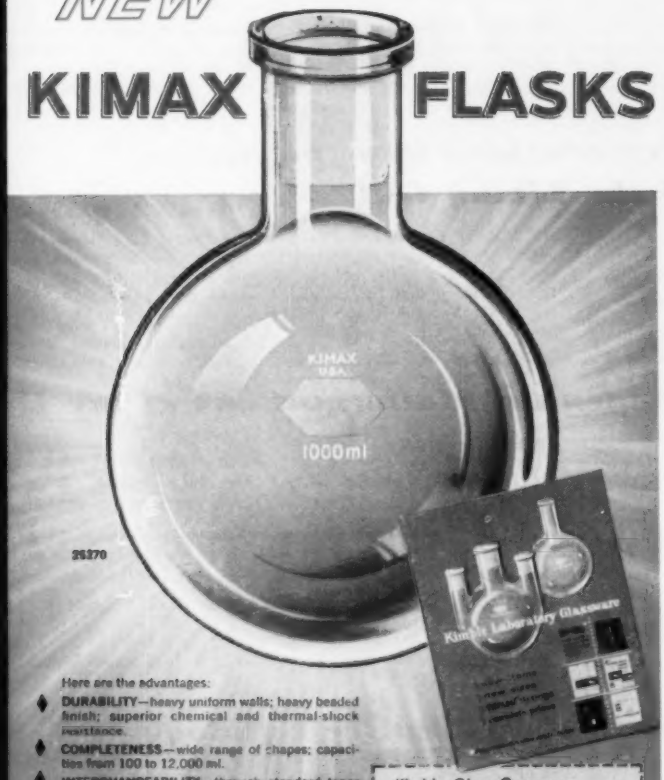

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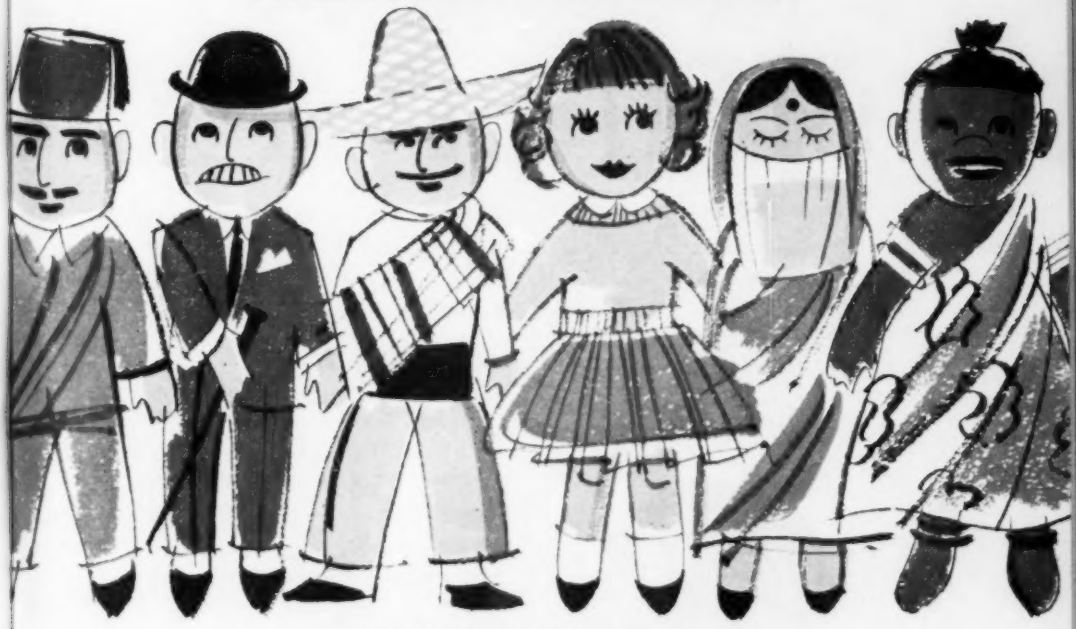

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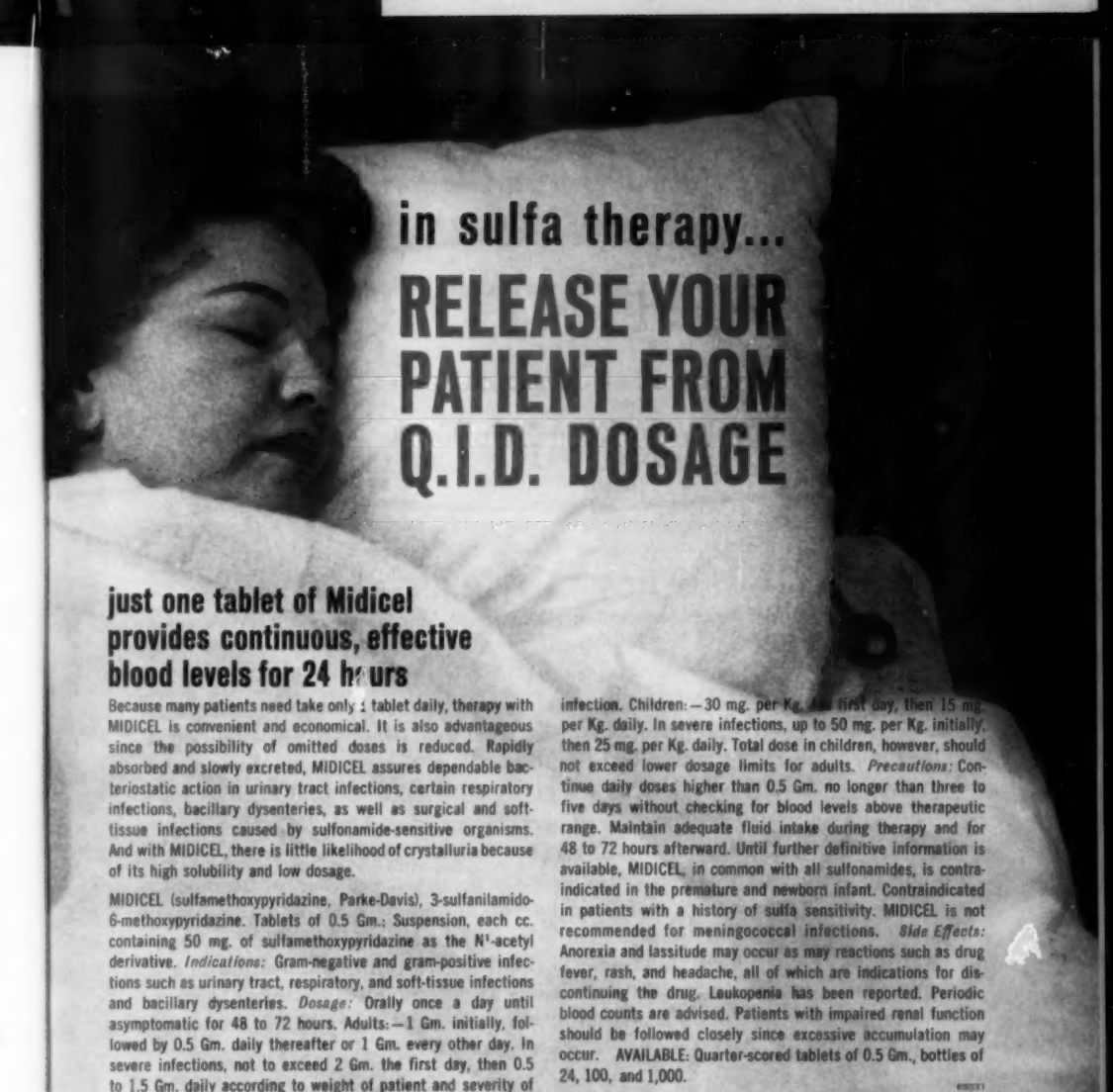

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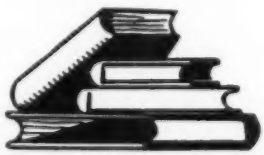

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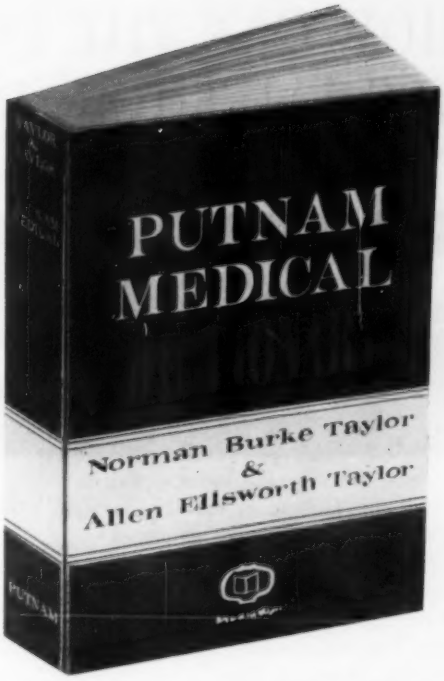

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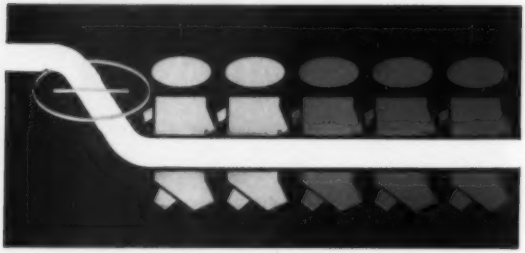

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1. Editorial (A.A.A.) New York J. Med. 59:4130, 1959. 2. Blöch, J., and Lenhardt, A.: Ann. New York Acad. Sc. 74:954, 1959. 3. Hamwi, G. J., and Skillman, T. G.: Postgrad. Med. 27:687, 1960.

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PRECAUTIONS AND CONTRAINDICATIONS: If hypoglycemia is encountered, the patient must be observed and treated continuously as necessary, usually 3-5 days, since DIABINESE is not significantly metabolized and is excreted slowly. DIABINESE as the sole agent is not indicated in juvenile diabetes mellitus and unstable or severely "brittle" diabetes mellitus of the adult type. Contraindicated in patients with hepatic dysfunction and in diabetes complicated by ketosis, acidosis, diabetic coma, fever, severe trauma, gangrene, Raynaud's disease, or severe impairment of renal or thyroid function. DIABINESE may prolong the activity of barbiturates. An effect like that of disulfiram has been noted when patients on DIABINESE drink alcoholic beverages.

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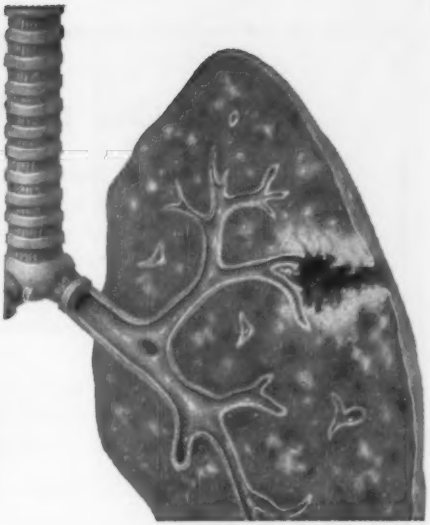

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Viomycin sulfate (VIOCIN) is the crystalline salt of an antituberculous antibiotic derived from the actinomycete, Streptomyces puniceus. In patients resistant to routine agents, VIOCIN provides significant therapeutic effect, particularly in combination with other antituberculous agents. VIOCIN protects against operative complications and is apparently *not cross-resistant with streptomycin or isoniazid.*

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ADMINISTRATION AND DOSAGE: VIOCIN should be administered by *deep* intramuscular injection, preferably into the gluteal, thigh, or deltoid muscles. The dosage employed for most forms of tuberculosis is 2 Gm. (given in two doses of 1 Gm. each, 12 hours apart) every third day, usually in combination with PAS (12 Gm. daily by the oral route). Therapy should be continued for at least four to six months. Daily administration of VIOCIN should never exceed 2 Gm. and should never be given continuously for more than one month.

SIDE EFFECTS: The toxicity of VIOCIN is related chiefly to dosage. When recommended dosages are used, toxic reactions are unlikely to occur with any degree of frequency or severity. They may occur in occasional individuals, however, and the following reactions should be watched for in all patients receiving the drug: renal irritation, disturbances of the eighth cranial nerve, allergic reactions and eosinophilia, electrocardiographic abnormalities, edema and fluid retention, and disturbances in the serum electrolyte pattern.

PRECAUTIONS AND CONTRAINDICATIONS: VIOCIN should be used under the close supervision of the physician, and should not be used when routine measures (as in minimal or primary pulmonary tuberculosis) or other drug therapy (streptomycin, isoniazid, PAS, either singly or in combination) would be effective. Like other antituberculous agents, VIOCIN is of relatively little value in the therapy of extensive caseous or fibrotic lesions. Patients with impaired renal function should receive lower dosages and be carefully watched for signs of toxicity. The similar nature of the toxic manifestations of streptomycin and VIOCIN suggests that these two drugs should not be used concomitantly except when the potentialities of other drug combinations have been exhausted. They should not be used on the same day, and the higher dosage ranges should be avoided.

SUPPLIED: In vials containing the equivalent of 1 Gm. or 5 Gm. viomycin as the sulfate. Diluent to be added.

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1. Davey, W. N.: GP 19:107, No. 1, 1959.

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Case data courtesy Henry Dolger, M.D.

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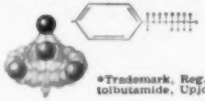

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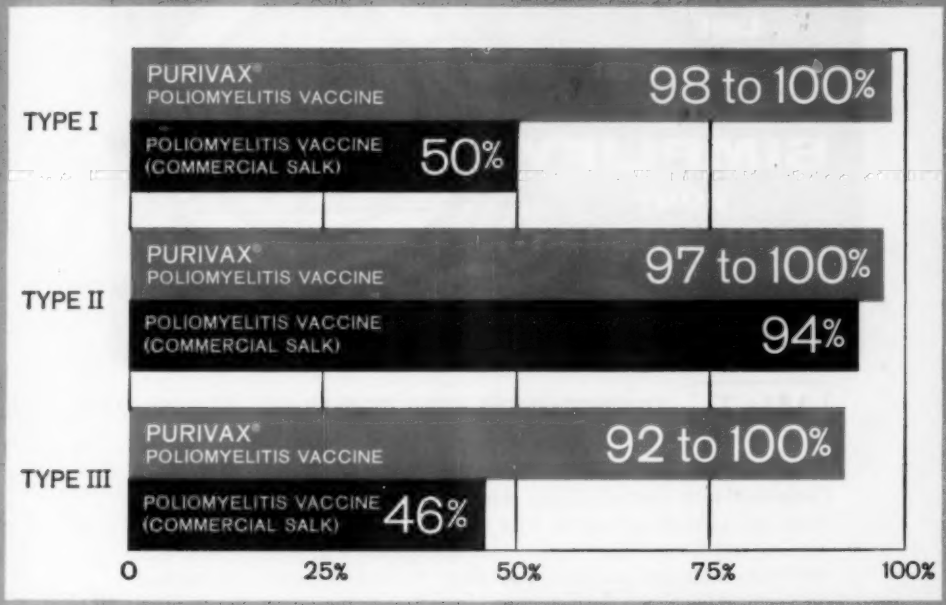

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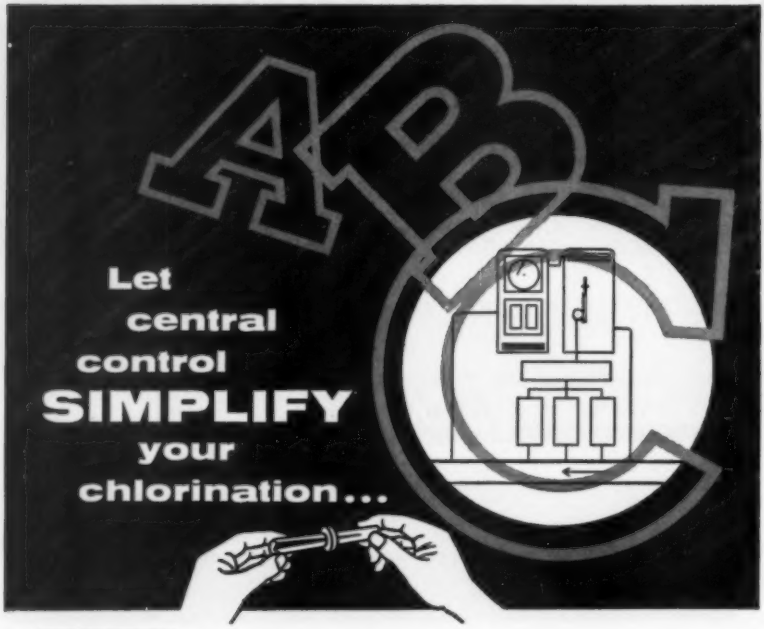

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Journal of Public Health

Virology on the Bookshelf—This year the lead article of our annual book issue introduces a variation in the pattern established for over a decade. To deal with the rapidly growing and changing field of virology it appeared more appropriate to review the literature of an aspect of diagnostic virology. From time to time the Journal will present articles reviewing other fields of public health work.

VIROLOGY ON THE BOOKSHELF

APPLICATION OF TISSUE CULTURE TECHNICS TO DIAGNOSTIC VIROLOGY IN THE PUBLIC HEALTH LABORATORY

Nathalie J. Schmidt, Ph.D., and Edwin H. Lennette, M.D., Ph.D.

PROPAGATION of viral agents in cultures of a variety of mammalian cells has provided the diagnostic laboratory with a tremendously valuable tool. The use of tissue culture technics in virology has greatly extended the number of viral agents which may be studied in the laboratory, and the recognition of more than 100 new viruses over the course of the past decade has been made possible through the use of tissue culture host systems. In addition, the use of tissue culture procedures has provided the diagnostic laboratory with technics for viral isolations and antibody assays which may be far less cumbersome and less expensive than procedures employing animal or embryonated egg hosts.

Utilization of tissue culture systems for virologic studies is now within the realm of smaller laboratories, as there are several reliable commercial sources of tissue culture media, sterile serums, and nontoxic detergents for glassware preparation. It is even possible to purchase cell cultures which are ready for inoculation, thus eliminating the need for maintaining lines of cells or animals necessary for specific tissues or cells. Most important, smaller laboratories now have access, through commercial channels, to high quality immune serums for use in identification of the viral

agents which they may isolate in cell cultures. Reliable serologic antigens and controls are also commercially available, making it feasible for even very small laboratories to undertake a limited program of viral diagnostic testing.

One of the simple, and yet most significant developments in the technic of in vitro cell culture has been the incorporation of antibiotics into the nutrient media. Prior to the availability of antibiotics, tissue culture technics were highly exacting and limited for the most part to small scale studies in morphology and physiology. However, it is still necessary to observe aseptic technic in handling cell cultures in order to avoid contamination with fungal agents and antibiotic-resistant bacteria. The problem of contamination of cell cultures with pleuropneumonia-like organisms and L forms of bacteria has recently received considerable attention, and contamination of cell lines with filterable organisms has been found to be widespread.[1-3] The two most likely sources of contamination with these filterable organisms are considered to be the original tissue itself or, through the conversion of bacterial contaminants to stable L forms, by the antibiotics used in the culture media.[3,4] The practice of adding antibiotics to media before sterilization by filtration, which may serve to convert bacterial contaminants to filterable forms is thus to be discouraged. As yet, no consistently reliable method has been found for eliminating pleuropneumonia-like organisms (PPLO) from cell lines, although treatment of the cell lines with large doses of aureomycin[5] and incubation at 41° C[6] have been effective.

The use of cell dispersing agents such as trypsin and versene for preparation of cultures constitutes another important advance. Dispersed cells grow directly on a glass surface and develop into a smooth sheet of cells. This is a simpler procedure than the earlier one of imbedding bits of tissue in plasma clots, and gives more uniform replicate cultures. Dispersed cells are also used in metabolic inhibition tests, which will be discussed below, as well as spinner cultures employed for large-scale cultivation of cells.[7]

A number of mammalian cells have been carried in continuous passage for many years, and are widely used throughout the world. Cloning of cells[8,9] has provided more stable cell lines, which are considered to be more uniform in susceptibility to viral agents and less affected by environmental influences.

The demonstration by Dulbecco and his co-workers[10,11] of the development of plaques, or areas of necrotic cells, from single infectious viral particles has not only contributed much to basic studies in virology, but has also proved applicable to certain problems in diagnostic virology. For example, neutralization tests may be conducted by the plaque reduction method for several viral agents which do not produce clear-cut cellular destruction. This is particularly true of the group B ARBOR viruses which do not produce distinct cellular degeneration in liquid media, but nevertheless produce plaques which do not stain with neutral red.[12,13]

Vogel and Shelokov[14] demonstrated that certain myxoviruses which do not produce distinct cytopathic effects in cell cultures may be detected in the infected cells by their ability to adsorb red blood cells onto the infected cell sheets. This technic, called "hemadsorption," has provided the virologist with a tool for the detection and quantitation of the newly described parainfluenza viruses[15,16] as well as a means for assay of neutralizing antibodies to these myxoviruses.

Perhaps the most important application of tissue culture procedures in the diagnostic laboratory is in the isolation of viral agents from clinical materials. The choice of a tissue to be

used for this purpose depends upon the source of the clinical specimen and the agent suspected to be etiologically involved. Monkey kidney cell cultures are suitable for isolation of a large number of enteroviruses from stool specimens, e.g., poliomyelitis, the group B and type A9 Coxsackie viruses as well as the 28 ECHO virus types. It is also a suitable tissue for recovery of the newly described parainfluenza viruses from throat washings. Human cells in continuous passage, e.g., strain HeLa, strain KB, or the FL strain of human amnion cells, are the cells of choice for isolation of adenoviruses from throat washings, and may also be used for isolation of poliomyelitis viruses and the group B Coxsackie viruses from stool specimens. They are not, however, suitable for primary isolation of the ECHO viruses or the parainfluenza viruses. HeLa cells may be employed for isolation of two newly recognized agents which cannot be isolated in monkey kidney cells, namely the Coe virus,[17] recovered from throat washings of individuals with mild respiratory illness, and the Pett. virus,[18] recovered from stools of children with mild respiratory illness.

The presence of a viral agent in inoculated cell cultures may be detected either by observing the cytopathic effect, i.e., cellular degeneration, in the inoculated cultures or, in the case of certain myxoviruses which do not give rise to distinct cellular degeneration, by the addition of red blood cells to the cell sheet and observance of hemadsorption.

It is necessary to distinguish between cellular destruction due to specific viral effect and that due to toxicity of the inoculum, which usually occurs earlier than specific cytopathogenesis. It may be necessary to subpassage the material in order to dilute out the toxic effect of the original inoculum. In employing hemadsorption as an indicator of the presence of viral agents, it must be kept in mind that certain simian viruses occur as natural contaminants of monkey kidney cell cultures, and that these may cause hemadsorption[19]; the possible occurrence of such effects should be ruled out by testing a number of uninoculated control cultures of the same lot for hemadsorption.

Important in the isolation of viral agents in cell cultures is avoidance in the maintenance medium of substances which may possess virucidal or neutralizing activity. Serums of a variety of animal species have been shown to possess neutralizing substances for certain of the human viruses.[20,21] Whenever feasible, cell cultures for viral isolation attempts should be maintained in a medium free from serum; if this is not possible, the serum used should be one which has been pretested and found free of antiviral activity. Skim milk[22] and egg white[23] have been successfully substituted for serums in maintenance media employed for certain cell cultures, and offer considerable promise in protecting against the inadvertent addition of viral antibodies to cell cultures through the use of serum-containing maintenance media. Proper buffering of the cell cultures is also of importance, as a decrease in pH below the neutral level may interfere with viral multiplication.[24,25]

The importance of subpassaging infected cells as well as tissue culture fluids for propagating viral isolates has been well illustrated in the case of the varicella-zoster virus, which can be passed from culture to culture only through the passage of infected cells.[26,27]

With the variety of cell cultures now available to the diagnostic laboratory, the isolation of viral agents from clinical materials is a relatively simple matter. However, the recovery of large numbers of viral agents contributes nothing unless the agents can be properly identified. For this reason, any diagnostic laboratory undertaking viral isolation

should prepare, or purchase, immune serums to the viral agents likely to be recovered in the tissue culture systems employed. At this time, many of these immune serums are commercially available.

Identification of viral agents recovered in tissue culture systems is usually accomplished by the neutralization test. For this procedure, a standard amount of the unknown virus, usually 100 TCD_{50}, is mixed with known immune serums, and after a suitable incubation period the serum-virus mixtures are inoculated into cell cultures in order to determine which, if any, of the immune serums is able to prevent cytopathogenesis or hemadsorption. A modification of the neutralization test which has proved particularly useful for the identification of viral agents is the metabolic inhibition test in which multiplication or nonmultiplication of the virus is detected colorimetrically. If the virus is specifically neutralized by an immune serum, cellular metabolism is unimpaired, and the medium is converted from alkaline to acid, as indicated by a shift in color of the phenol red indicator from red to yellow. For this procedure, the cells, virus and serum are all added to the test on the same day, eliminating the need for preliminary preparation of monolayer cell cultures in tubes. The greatest time-saving advantage of the technic lies in the fact that after seven to ten days' incubation the results may be read colorimetrically, eliminating the need for tedious and time-consuming microscopic observation. Metabolic inhibition tests have greatly facilitated the identification of adenoviruses,[28] the poliomyelitis viruses,[29] and certain of the Coxsackie viruses.[29,30]

Certain viral agents may be identified by the complement-fixation technic, employing infected tissue culture fluids as antigens and testing for their ability to fix complement specifically with known immune serums.[31-34] However, this procedure is most useful for large-scale epidemiologic studies, and usually is not too practical for the smaller diagnostic laboratory.

Laboratory diagnosis of viral infections may also be established by demonstrating an increase in antibody level against a given viral agent over the course of illness. A fourfold or greater increase in antibody titer is considered of diagnostic significance. For serologic diagnosis, the neutralization test conducted in monolayer tube cultures is tedious and time-consuming, as it requires prior preparation of cell cultures and microscopic observation, and thus does not lend itself to large-scale studies. However, the colorimetric or metabolic inhibition neutralization test has found widespread application in assay of serum neutralizing antibodies, and has made possible large-scale epidemiological and immunological studies on the viruses of poliomyelitis,[35-37] group B Coxsackie viruses,[38] Western equine encephalomyelitis,[39] herpes simplex,[40] and certain adenoviruses,[41] and ECHO viruses.[42] The test has been shown to possess a high enough degree or reproducibility to permit the use of a single tube for each serum dilution tested.[43]

A drawback to the use of the neutralization test for serologic diagnosis of viral diseases lies in the fact that the neutralizing antibody response is relatively rapid in many viral infections, and the maximum titer may have been attained by the time the acute-phase serum specimen is taken, making it impossible to demonstrate a diagnostically significant rise in neutralizing antibody titer.

In most viral diseases complement-fixing antibodies appear later than neutralizing antibodies, and the complement fixation test is usually of greater diagnostic value than the neutralization test. The use of tissue culture host systems has extended the number of viral agents for which complement-fixing antigens

may be prepared. Recent studies[44,45] on improvement of the potency of complement-fixing antigens produced in tissue culture systems have revealed a number of factors of importance in production of high-titered antigens, for example, the number of host cells infected and the nutrition of host cells during the period of viral multiplication. Studies of this nature will undoubtedly improve the quality and potency of tissue culture-derived antigens for an increasing number of viral agents. Complement-fixing antigens for the adenovirus group, the poliomyelitis viruses, and certain parainfluenza viruses are now commercially available together with immune serums for standardization and control purposes.

Flocculation or precipitation tests for viral agents are receiving increasing study and attention.[46-48] Here again, the use of tissue culture-derived antigens has contributed much in the way of providing easily prepared antigens containing relatively little host material which might interfere with specific aggregation. Although at this time the technics are feasible only on a research basis, the development of micromethods and improvements in preparation of antigens may well place flocculation and precipitin tests within the realm of the viral diagnostic laboratory, which would be highly desirable in view of the directness of the method and the small number of reagents involved.

The relative simplicity of tissue culture procedures should make it possible for many public health laboratories to develop rewarding programs of viral testing without the need for housing animals or maintaining a supply of embryonated hens' eggs in various stages of incubation.

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The authors are associated with the Viral and Rickettsial Disease Laboratory, California State Department of Public Health, Berkeley, Calif.

Institutional living is an increasingly significant factor in the handling of health problems. Some of the effects of this factor are discussed in the group of four papers presented below.

THE FACTOR OF INSTITUTIONAL LIVING IN THE NATION'S HEALTH

L. S. Goerke, M.D., M.S.P.H., F.A.P.H.A.

IN JANUARY, 1959, the nation had 1,322,000 civilian hospital beds and 245,000 beds in nursing homes which provide skilled nursing care, exclusive of federal hospitals operated by the Veterans Administration and the Public Health Service. On the basis of fire and health hazards, 168,000 hospital beds and 12,000 nursing home beds are classified as nonacceptable; 16.6 per cent of the mental hospital beds, 13.0 per cent of the chronic disease beds, 9.2 per cent of the tuberculosis beds, and 10.1 per cent of the general hospital beds are unacceptable.[1] According to the 13th Annual Report of Hospital Statistics, 1958, by the American Hospital Association[2] there were 6,786 hospitals in the continental United States with a total of 1,572,036 beds and 23,697,157 admissions. On the average day there were 1,322,938 patients and 1,464,829 full-time equivalent workers, or a total of 2,787,767 people in hospitals on a given day. With an estimated 300,000 nursing home patients and personnel, considerably more than three million people are in medical care institutions for at least eight hours a day. The number of physicians, volunteers, visitors, and others, such as tradesmen, in institutions each day is unknown. In other words, about 2 per cent of the nation's population is exposed to the environment of medical care institutions every day.

While the number of hospital beds has declined from 10.3 per 1,000 population in 1946 to 9.1 in 1958, the admission rate has increased steadily from 112 to 137 per 1,000 population over the same period. The average length of stay per admission in nonprofit, nongovernmental hospitals has decreased from 14 days in 1934 to 7.6 days in 1959, with the older age group experiencing about twice the average stay. While the average period of hospitalization is shorter, the number of admissions is increasing, resulting in an increased total hospital bed usage per person.

There has been a steady increase in the total number needed of civilian general and chronic hospital beds, in the number of existing acceptable beds, and in the ratio of existing acceptable beds per 1,000 population, exclusive of mental and tuberculosis hospital beds; in the latter, the reverse obtains. Total mental hospital bed needs and the number of acceptable existing beds have increased but not in proportion to population increase. There has been almost a doubling in the number of nursing home beds, with more than a 100 per cent gain in the number of acceptable beds, and in

meeting estimated need during the past four years.[1]

Our chances that our arrival in and departure from this world will occur in an institution increase each year. In 1935, 37 per cent of births and 34 per cent of deaths at all ages occurred in hospitals in the United States. In 1955, almost 95 per cent of births were in hospitals, and in 1949, about 50 per cent of the deaths occurred in hospitals. The latter figure would be much higher if deaths occurring in long-time care facilities and nursing homes not classified as hospitals were included.[6]

The public, professional and fund raising groups, voluntary and governmental agencies are concerned with the location of medical care institutions in relation to shifting population, modes of travel, physicians' offices and available paramedical personnel, land and space use, building and operating costs. They are also concerned with the increasing demand for specialized professional and technical services and equipment, the rapid turnover of patients and personnel, multitudinous report forms and billing, fee schedules, legal hazards, governmental control and regimentation, and insecurity in planning for the rapid advances in scientific medicine, technics, and equipment for diagnosis, treatment, and rehabilitation.

General Hospitals

The general hospital is the institutional key to related community service facilities. In addition to providing extensive inpatient and outpatient diagnostic and therapeutic services, it serves as the referral point for patients to such specialized facilities as mental, tuberculosis and chronic disease hospitals, nursing homes, and rehabilitation centers. Many chronic diseases can be stabilized or limited or cured more readily by intensive therapy in the controlled environment of the hospital. Some of the newer drugs and methods of treatment are more securely administered under 24-hour observation and periodic testing. Many cases of collagen disorder, heart disease, anemia, diabetes, and other diseases require periodic hospitalization for reevaluation and stabilization of drug dosages, health education, including instruction of patient and family in home care, and psychologic support, when these services cannot be provided in the home, private office, outpatient clinic, or nursing home.

It is the general hospital that provides the convenient facilities and professional personnel for specialized surgery for diagnosis and treatment, such as cardiac catherization and corrective surgery, and for the use of the more recently developed isotope therapies. The hospital frequently is the scene of the first steps in physical, and in some instances, sociopsychologic rehabilitation. Hospitals are the focal points for advances in medical science, especially the application of new knowledge that is developed by the basic disciplines supporting medical practice. New discoveries and scientific knowledge must be communicated and utilized to improve the health and welfare of the public. Expensive diagnostic and therapeutic equipment and specialized services are hospital-centered serving private doctors' offices, chronic disease wards and, with greater frequency, nursing homes.

Rising income and standard of living, higher levels of education and understanding, and trends toward comprehensive medical care insurance are factors influencing the American people and physicians to utilize hospitals for presymptomatic or preclinical evaluation and diagnosis, preventive measures, psychiatric and work evaluation, and health education. This trend presents a challenge and demand for the highest levels of manipulation and control of the institutional environment since the apparently-well and less-ill clientele are less

tolerant of a poor physical and social environment. They expect to leave the hospital in better health, or potentially better health, than when they arrived, and since they are biologically better than their predecessors of a few decades ago, their expectations are higher.

In all types of institutions, modern medicine requires the organization of highly technical, complex, and extensive support for medical care for which the physician has primary responsibility. Maintaining the intricate and sensitive relationships between the public, the physician, and the institution in direct, easily understood terms is made more difficult by the scientific, philosophical, social, and economic factors of modern living. These forces are continually affecting the role of the institution as they are the role of the physician, the nurse, the social agency, and the government.[3] These factors, together with evidence that an increasing percentage of the population wants comprehensive medical care and is willing to pay for it in several ways, emphasize the need for general hospitals to provide not only acute medical and surgical beds but also less expensive nursing home services and dormitories for ambulatory cases and for those whose physical disabilities are stabilized and who are undergoing physical and vocational rehabilitation.

The outpatient clinic is becoming an organic part of the general hospital, providing the home base for physicians, consultants, nurses, physical therapists, social workers, nutritionists, and other related medical care personnel, and mobile laboratory, x-ray, and service equipment appropriate for hospital-based extended home care. An increasing number of physicians' offices, many sharing reception rooms, business offices, and personnel, are located near the hospital and utilize its laboratory and x-ray services. The general hospital with its specialized equipment and personnel, surrounded by the physicians' offices and personnel, constitutes the modern community medical center. This arrangement prevents duplication of equipment and specialized personnel, is convenient for the patient and his personal physician, enhances the opportunity for comprehensive medical care at a lower cost, and provides an environment for continuing education and research.

Facilities for the Mentally Ill

American society has been slow and reluctant to recognize the need for community planning for the mentally ill and continues to rely on late identification and isolation outside the social group. There are about as many patients in mental hospitals as in general hospitals. Mental institutions are a negative factor in the health of the nation. These institutions are not coordinated with community needs, and have generally shown little leadership in rehabilitation and the development of community services for early diagnosis and treatment, and for posthospital adjustment, support, and treatment. The difficulty of developing leadership in the face of public attitude is recognized. On the other hand, on the operational level, neither public health nor welfare agencies have demonstrated an active interest and concern for the environmental factors that influence this problem. There has been social rejection of the mentally ill. Positive recommendations are now developing for: (1) broad community understanding and acceptance of the mentally ill as human beings with individual personalities, needs, capacities, and rights to share in and contribute to community living; (2) adequate psychiatric services to meet the special needs of mentally ill patients and their families for treatment, care, and supervision; (3) other adequate public and private agency services to meet the needs of all individuals in the community who have social and economic difficulties which may con-

tribute to mental illness; (4) acceptance of mentally ill patients for care in community general hospitals; (5) planned coordinated service for a continuum of care from early diagnosis or suspected diagnosis through rehabilitation; (6) well defined legal and moral responsibility.

Chronic Disease and Long-Term Care Facilities

Mental disease and long-term care facilities have had much in common in the past. They have provided custodial care, isolation of the patient from the community, and have been a means of relieving the family of immediate daily responsibility for the patient's physical, biologic, and social care. The older age group constitutes a high percentage of the patient population in these institutions, which are predominantly county hospitals and sanitariums and nursing homes. Rest homes, nursing homes, aged homes, sanitariums, convalescent hospitals, and mental homes have various and ill-defined roles in providing care for the long-term ill and disabled. Government and public health and welfare agencies have been slow to recognize the need for setting standards and methods of assuring reasonable levels of quality care. One of the serious problems is that official and voluntary agencies have shared various degrees of responsibility but none has primary legal or possibly moral responsibility. Too few of these facilities are formally or informally associated with a general hospital for professional guidance and technical service.

The Effects of Institutions on Individuals

For the short-stay patient, hospitalization contributes to an improved health status and is generally satisfactory to the patient and his family; patients seldom complain about the physical and biological environment but do frequently complain about the social environment. Peter Townsend[4] makes a number of points regarding the potential harmful effects of the institutional environment on long-term patients. "In the institution people live communally with a minimum of privacy, and yet their relationships with each other are slender. Many subsist in a kind of defensive shell of isolation. Their mobility is restricted, and they have little access to society. Their social experiences are limited, and the staff leads a rather separate existence from them. They are subtly oriented toward a system in which they submit to orderly routine, lack creative occupation, and cannot exercise much self-determination. They are deprived of intimate family relationships and can rarely find substitutes which seem to be more than a pale imitation of those enjoyed by most people in the general community. The result for the individual seems to be a gradual process of depersonalization. In some of the smaller and more humanely administered institutions these various characteristics seem to be less marked but still to be found."

Various reports on the hospital environment were succinctly summarized by Townsend. Long-stay patients tended to be left to themselves; their case files were often inadequate; the turnover in medical and nursing staff meant that continuing relationships were not possible; the staff underestimated the capabilities of patients to communicate with them intelligibly; inactivity on the wards and institutional routine sometimes resulted in incontinence; many normal skills fell into disuse; there was a real risk of loss of identity and of desocialization. Some staff hierarchies break down into a series of informal, often clandestine, friendship patterns; on the other hand, the hierarchy tends to keep patients in their place. One study showed how authoritarianism causes the breakdown in personal relations that is so fatal to a "therapeutic" community.[4]

Hazards of Institutionalization

The hazards to patients and employees of institutionalization can be grouped under the usual categories of physical, biological, and social environment. While well organized and administered institutions have systems for reporting data regarding accidents to patients and employees, for analysis of these data and plans for prevention of reoccurrence, it is most difficult to obtain reliable incidence of hospital-related physical and biological accidents. For obvious reasons, during our current sensitivity to recurrent liability, negligence, and malpractice suits, few institutions wish to be identified singly or in a group as having experienced accidents due to poor equipment and maintenance; electrical failure; overloaded plumbing; contaminated food or equipment; improperly packaged, stored, and handled radioisotopes; limited or no fire drills or instructions; chemical and biologic supplies mislabeled, malstored, and mishandled; closed system ventilation breakdown; uncontrolled staphylococcus, streptococcus, and infectious hepatitis outbreaks; epidemic diarrhea of the newborn; and many other physical and biological causes of institutional accidents too numerous to list here. Given the perfect physical plant, ideal equipment, and plan, I believe that the social factors of the environment have the greatest influence on the incidence of accidents in institutions. The chances of accidents occurring are in inverse proportion to the degree of clear channels of administrative responsibility and supervision and ease of authoritative communication.

Medical and Campus Institutions

No organization is more challenging, complex, and sometimes more confusing and frustrating than the educational institution with a medical center which serves the student body and the surrounding community with comprehensive medical care, multiprofessional training, and research. Such an institution becomes a concentrated city of 20,000 to 30,000 people of all age groups from all parts of the country with a wide spectrum of health and heritage. A modern teaching and research medical center, for example, may have approximately 400 medical students, 400 dental students, 300 residents and interns, 200 to 300 full-time faculty, 800 to 1,000 part-time faculty, 100 to 300 full-time research and nonacademic personnel, 500 to 1,000 inpatients, over 1,000 outpatient and student health service visits daily, 500 to 2,500 paramedical students, about 3,000 medical center employees, more than 100 volunteers, and more than 1,000 patient and extension student visitors. It means that roughly from 4,000 to 6,000 people will be moving about during the regular working day and especially during the academic year, in a floor area of, let us say, 1,000,000 sq ft. Furthermore, the student body, patients, and visiting population changes from day to day and year to year. Medical centers tend to have about double the rate per 1,000 employees time-lost injuries for the rest of the campus.

Several schools and colleges within the social structure of a campus have use, concern in, and control of a medical center; and the medical center administration, especially business management, has a close working relationship with campus administration—so much so that responsibility and authority sometimes become confused. The teaching hospital has three power structures: the administrative, the academic and research, and the professional medical care personnel, particularly the physician specialist. The relative authority and responsibility of each power group changes rapidly and frequently with changing circumstances and issues.

Table 1—Report of Injuries by Campus for Period July 1, 1959-June 30, 1960

Campus	Total Number Employees	All Injuries Reported	Time-Lost Injuries Only	Rate per 1,000 Employees: All Injuries Reported	Rate per 1,000 Employees: Time-Lost Injuries Only	Percentage of All Campus Total: All Injuries Reported	Percentage of All Campus Total: Time-Lost Injuries Only	Percentage of All Campus Total: Employees (Approximately)
Berkeley	11,340	578	88	51	7.76	23.0	21.1	31.3
Radiation Laboratory	6,000	409	67	68	11.1	16.3	16.1	16.6
Los Angeles	6,626	207	44	31	6.6	8.2	10.6	18.3
Los Angeles Medical Center	3,046	272	39	89	12.8	10.8	9.4	8.4
San Francisco Medical Center	3,627	505	70	139	19.3	20.1	16.8	10.0
Davis	2,520	301	50	119	19.8	12.0	12.0	10.0
Santa Barbara	1,288	60	15	46.6	11.6	2.4	3.6	3.5
Riverside	1,000	57	21	57	21.0	2.3	5.0	2.8
La Jolla	725	107	20	148	27.6	4.3	4.8	2.0
Mt. Hamilton	47	12	2	255.0	42.5	0.48	0.49	0.13
Total	36,219	2,508	416	69	11.5	100	100	100

Nevertheless, the lines of responsibility do tend to clear with a law suit, using the principle of "respondent superior." Accident prevention is ultimately the responsibility of the administrative hierarchy, and it is this group that must create the social environment conducive to easy communication and inservice training.

Shared responsibility includes residents, interns, nursing staff, medical technologists, physical therapists, medical records, librarians, sanitarians, social workers, dietitians, and hospital administration students assigned by academic departments, some outside the medical center, for practical training. With the chiefs of various hospital departments, such as Central Laboratories, Nursing, and so forth, responsibility may be clear and the basic academic departments can enhance environmental accident prevention by training the paramedical personnel in the subject. As one of our hospital department chiefs has said: "If the students and employees just had an awareness of accident prevention, it would help." Morris[7] indicated a way to develop a safety program. Analyze the accident and incident report to provide (1) a basis for improvement of the hospital routine or environment, (2) a basis for training and teaching students and staff, and (3) an intimate knowledge of incidents which may some time reach a court of law. Clear administrative channels of responsibility and supervision, individual awareness and knowledge of preventive measures, as well as well trained radiation and safety personnel, engineers, and sanitarians as expert watch dogs and consultants, are the necessary ingredients of a program which will reduce the hazards to patients, employees, students, and to the public in large institutions.

Massive buildings, increasing multiplicity of technical services, improving quality of medical care involving many professional areas, and the need for a large number of trained medical and paramedical personnel, and the larger population involved in medical care services, teaching, and research have created a most complex environment which influences the health and welfare

of the nation's population. The social factors involving all members of the institution's population present the most pressing problems of control and solution, demanding the best of administration and management.

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Dr. Goerke is associate dean, University of California School of Public Health, Los Angeles, Calif.

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ENVIRONMENTAL HEALTH NEEDS IN COLLEGES AND UNIVERSITIES

Richard G. Bond, M.P.H., F.A.P.H.A.; George S. Michaelsen, M.S.; Gustave L. Scheffler, B.S.C.E.; Lee D. Stauffer, M.P.H., F.A.P.H.A.; and Ralph O. Wollan, B.A.

CONSIDERATION of the environmental health needs of this nation's institutionalized population would be incomplete without attention to our colleges and universities. Conventionally, we do not think of students and staff members as a part of the institutionalized population. While they do not fit the conventional pattern in many respects, it is essential that professional public health workers not differentiate between categories of medical and nonmedical institutions. Although this presentation is limited to the environmental health needs of colleges and universities, much of what applies for these institutions would have equal application for junior colleges, elementary, and secondary schools.

Dr. Goerke described the magnitude of our medically institutionalized population. He has shown that our chances of arriving in and departing from this world within the four walls of an institution are increasing each year. In like fashion, our chances of spending a large portion of our late teens and early adulthood in institutions is also increasing rapidly each year.

In 1959, there were nearly 2,000 ac-

credited colleges and universities in this country. The student population enrolled for the purpose of obtaining a degree was in excess of 3,400,000. Imposing as this figure is, in terms of affected population, it is even more impressive to consider the current estimate that there will be more than 6,000,000[1] such students on our college and university campuses just one decade hence. In addition to these full-time students, our educational institutions accommodate great numbers of part-time students who attend the extention and short course activities.

Contributing to the health needs of our college population are the 350,000 professional staff[2] and estimated equal number of other personnel employed to provide instruction and services for these students. Since they are centers for community recreational and cultural events, these institutions also serve as hosts, within their buildings and on their premises, to millions of the public. Therefore, a large segment of our nation's population is exposed to the prevailing levels of environmental health and safety found within the physical environment of our colleges and universities.

The magnitude of the physical environment which has been provided to serve this population further illustrates the need for environmental health and safety services. For these 2,000 accredited institutions, the estimated valuation of the buildings that house the classrooms, laboratories, and service functions amounts to billions of dollars. More significant, perhaps, is the expanded physical plant that will be required during the next decade to accommodate the additional millions of students who will be coming to these institutions. To provide for this expansion, is is estimated that colleges and universities will be required to invest at least $1.2 billion annually in new and existing buildings and campus improvement for approximately the next ten years.[3]

Numbers of students and investments in buildings and grounds do not, in themselves, indicate the size and scope of the problem. Our colleges and universities represent a unique way of life —the characteristics of which add emphasis to the importance of providing high levels of environmental health and safety. As compared to the average community, a greater proportion of these millions of students is eating out, a much greater proportion is in rental housing of one form or another, a much greater proportion of the population is participating in recreational activities, and the entire population is, in effect, engaged in a wide variety of activities of an industrial type.

Today our colleges and universities are complex centers of activity embracing teaching, research, and public service. The latter two, in many instances, are of major importance in terms of environmental health and safety considerations. We have said that our colleges and universities are essentially industrial centers. More specifically, they are centers of many little industries, all of which undergo frequent changes in their industrial processes and in the types of environmental exposures to which their employees, the college students and staff, are subjected. For example, the student in the chemistry laboratory is as much involved in an industrial operation as an employee in any equally small chemical industry. In the case of the chemical industry, the employee very likely carries out the same operations day after day, using the same products with the same anticipated hazards. However, in the college chemistry laboratory, the experiments and the inexperienced labor force are constantly changing; thus, unexpected and unanticipated environmental health and safety hazards are presented. This analogy can be carried to every labora-

tory and into nearly every classroom of our colleges and universities. Students and faculty are repeatedly exposed to a broad spectrum of physical, chemical, and biological health hazards.

The rapidly expanding research activities in these institutions forecast greater environmental hazards in the future. Today, in all of the larger colleges, and to an increasing extent in the smaller ones, the budgets and staff devoted to research activities are rapidly approaching, in size, those devoted solely to teaching.

During 1957-1958 colleges and universities spent $780 million for research and development. Approximately $392 million of this amount were used for basic research in the physical and life sciences.[4]

Very frequently both applied and basic research projects have associated with them problems of environmental health and safety. These problems exist, on the campus, in terms of potential hazards to the research personnel and their colleagues. Frequently, they also extend into the community and the state, because many of these research products which have their origin and development on the campus subsequently become industrial products which create environmental health problems in the community. Successful solution of the campus problems would aid in the ultimate evaluation of the hazards resulting from the industrial application of these products of basic research.

Perhaps the most important products of college research activities are the scientists and the technicians themselves. They are trained on the campus, do their research there, make their discoveries there, and then move into industry and into the community. How desirable it would be for them, while at the university, to acquire the essential environmental health concepts relating to the work they are doing, so that they might take those public health measures into the community.

When we discuss the environmental health and safety problems of colleges and universities with professional colleagues in public health, it is common experience to have them express the opinion that these problems are limited to a very few "giant" institutions. Such an assumption is incorrect. Of the 2,000 institutions of higher education in this country, more than 1,200 have an enrollment of less than 1,000 students. This relatively large number of "small colleges" deserves separate consideration in our enumeration of environmental health needs. Obviously when such a

Table 1—Use of Research and Development Funds, 1957-1958

Funds Used By	Total Research and Development	Basic Research	Basic Research as Per cent of Total Research and Development
Federal government	1,440*	111*	8
Industry	7,670	272	4
Colleges and universities	780	392	51
Other nonprofit institutions	150	60	41
Total	10,040	835	8

* Millions of dollars.
Source: National Science Foundation, August, 1960.

large number of concentrations of population are created, all of them have need for the basic and traditional environmental health services such as food sanitation, supervision of swimming pools, inspection of student housing, and routine surveillance of water supply, plumbing, and solid and liquid waste disposal. In addition, although small, these schools have laboratories presenting potential exposures to many hazardous materials.

The popular concept of a college being merely ivy-clad buildings and flirtation walks is, unfortunately, still too prevalent. Too often a college is within, but not part of, a town. The common lack of communication between "town" and "gown" has apparently further contributed to a "hands off" policy in relationships of public health departments with colleges and universities. These college population centers may be situated within the political boundaries of cities and towns, or they may be within the political jurisdictions of townships or counties. In any case, they are normally within the areas of authority of some form of local government. Traditionally, however, the boundaries of the campus and the activities within those boundaries have tended to be immune from local jurisdiction and, more important, have not received the public health services normally provided for that area. Unfortunately, because of a limited budget, these institutions have seldom been able to provide their own public health services beyond emergency first-aid and simple dispensary care. Certainly they have not been able to employ qualified people to give attention to their environmental health needs. Such deficiencies can be overcome, we believe, particularly with regard to environmental sanitation services. For example, the Division of Sanitary Engineering of the South Dakota State Department of Health has worked cooperatively with the state's Board of Regents, the State University's administration, and the director of the University Health Service. This work has included a very complete environmental health survey of the university. The survey report includes recommendations for implementing a continuing program in environmental health with several possibilities for staffing by the Department of Public Health, the state Board of Regents, and the university.[5]

At the opposite end of the enrollment scale, there are 165 universities with student enrollments in excess of 5,000. These small "cities" tend to experience an equal or even greater degree of isolation from the services of the communities in which they are situated than do the small colleges. Because of their size and complexity, they seem to be more self-sufficient, and certainly pose a more complex problem for the official public health agencies that might assume some degree of responsibility for the conditions of environmental health on the campus. For these institutions, then, a different approach to their environmental health needs is indicated.

Administrators of colleges and universities have recognized their responsibility for the medical care and health protection of students for many years. In fact, the first student health service in this country was established at Amherst College, in Massachusetts, 99 years ago. Today, in our larger colleges and universities, medical and nursing staffs provide students with clinical care, and, in most instances, considerable attention is given to preventive medicine through programs of routine physical examinations and immunizations.

Since 1920, the American College Health Association, the parent organization of student health service physicians, has given recognition on numerous occasions to the environmental sanitation problems of its member institutions. However, the number of institutions

that have provided professional staff to work in this area of public health is still quite limited. The reluctance of clinical physicians to embark on such programs is quite understandable, but the apparent failure of public health departments to recognize the need for such programs and staffing, or otherwise provide technical assistance in environmental health for these large colleges and universities is more difficult to understand.

Our larger universities offer a fertile field for effective environmental health work. Not only do they have all of the problems of the average community of comparable size, but, for the most part, these problems are accentuated and many new and interesting facets of environmental health work exist. The scope of these environmental health needs for the typical university fall into four broad categories: general sanitation, occupational health engineering, control of ionizing radiation, and safety engineering.[6]

In the field of general sanitation there is a wide range of food sanitation problems. In the university setting the well trained sanitarian can participate in review of plans for the construction of such facilities, the selection of equipment, and constructive supervision of its operation.

The sanitarian will find the need for and the opportunity to initiate a program for more healthful and safe housing for students without the arbitrary limitations of traditional ordinances and codes.[7] From our own experiences, we know that students place very unusual demands upon housing, and housing problems within college communities are greatly accentuated by the heavy influx of transient students.

In sanitation of water supply there is a wide variety of problems involving building distribution systems, water treatment, and water conditioning. Many large universities have auxiliary water supplies which provide an opportunity for the public health engineer or sanitarian to work effectively with engineers in plan review, construction, development, and routine surveillance. Certainly, in a complex of laboratories, there is need to ferret out and solve a maze of plumbing hazards.

As with food hygiene, housing, and water supply, the general sanitation program will demonstrate environmental health needs in the areas of solid and liquid waste disposal, insect and rodent control, and swimming pool operation. In the majority of these institutions there will be affiliated medical centers for which the sanitarian can provide service over the entire scope of his environmental sanitation program.

There is probably no other environment that offers the occupational health engineer the variety of problems that are found on the campus of a large university. The occupational health needs encompass the broad areas of heating, ventilation, and air conditioning, with both traditional and unique health considerations for the control of toxic gases, vapors, fumes, dusts, and biological contaminants. Not only is the occupational health engineer confronted with toxic exposures due to widespread use of mercury, lead, and the toxic solvents, but he will also encounter agricultural chemicals and the chemical components of medical and industrial research. In many cases the university's occupational health engineer will be asked to evaluate new products of research, many of which are so new that their toxicity is not yet completely known. Recently, at the University of Minnesota, the occupational health engineer has been confronted with the health problems arising from exposure of the eyes of human volunteers to electrons, the potential hazards associated with the use of missile fuels, and the need for control of excessive noise and vibration in con-

nection with wind tunnel and jet engine research.[8]

A relatively new and vital area of environmental health practice, the control of radiation hazards, is a major health consideration for all of our large colleges and universities and, to an increasing extent, for our smaller campuses. In most communities, and in many states, the university is the principal location of radioisotopes, which creates public concern both on and off the campus. In the university there is a concentrated use of radioisotopes with every imaginable application. As contrasted to a community, where a specific industry may be using a radioisotope for a specific purpose, on the campus a wide range of isotopes is being used under experimental conditions in almost every academic and research department. The universities also serve as centers for sources of high energy radiation, such as reactors, accelerators, and other specially designed radiation facilities and machines. The growth of such applications has been many fold during the past 15 years.[9] In the period 1946-1959 the number of colleges and universities licensed by the Atomic Energy Commission for receipt of radioisotopes has increased from 22 to 269.[10]

In this area of environmental health practice, the needs of the university and community are quite interdependent. For example, at the University of Minnesota, health physicists on the environmental health team work cooperatively with the State Department of Health in registration of the university's radiation sources, surveillance of off-campus use of isotopes by university personnel, and providing information on final disposal of radioactive wastes.[11]

Just as accidents are now one of the major public health problems for the nation's population, so is accident prevention one of the major environmental health needs of our colleges and universities. The characteristics of college life are conducive to accidental injury. A university is a concentration of very active people, all of them carrying on, rather independently, a wide range of activities under unique circumstances.

The housing of groups of students in dormitories, fraternities, sororities, or rooming houses creates a great potential for loss of life or injury from fire, falls, "horseplay," and other dangers identified with the problem of safe housing. In the laboratories and shops the risk of burns, cuts, and infections is ever present. The athletic and recreational activities of this segment of our population present constant exposures to accidental injury. Almost 50 per cent of campus injuries result from athletic activities. Pedestrian and vehicle traffic on the grounds, and rapid movement of many people through the buildings, add further to the accident record.

Several years ago a study of student accident experience was carried on cooperatively by the National Safety Council and the American College Health Association. This study of 11 colleges and universities gives ample proof of the magnitude of this problem. These universities reported that 8,473 students, over 10 per cent of the student population represented, received medical treatment for accidental injuries suffered during the school year of 1953-1954. Sixty per cent of these injuries occurred on campus.[12]

At the University of Minnesota a safety engineer has served as a member of the environmental health team for more than five years. It has been possible to demonstrate that our campuses present all of the accident potential that would be found in any community. In addition, a whole series of unique hazards has been encountered including showboat operations, mountain climbing, sky diving, well drilling, and lumbering. We have had an opportunity to coordinate the medical care of injured students with the preventive programs

of the safety engineer. The system of accident reporting in the Health Service has demonstrated benefits and efficiencies of medical and engineering teamwork.

As with other programs in environmental health, safety engineering is not limited to hazards to the student, but obviously is a valuable service to the academic and nonacademic staffs and research personnel.[13,14] These personnel represent virtually every trade and scientific discipline. They are engaged in many hazardous trades such as roofing, structural painting, and window washing. Prevention of injuries among these workmen is important not only as a public health measure but is also important to the administrators because of the costs of such injuries. Comparison of the accident experience at the university with the national experience in the same trades shows a saving to the university in Workmen's Compensation costs of approximately $200,000.

The four broad areas of service we have described—general sanitation, occupational health, radiological health, and safety engineering—must all be brought to bear on the greatest problem facing both the small and large colleges: the building boom and expanded research activities in the years ahead. There is a great need for plan review services and development of adequate construction standards. These services can and should be furnished by environmental health personnel.

For our larger colleges and universities there is need for professional staffing to cope with the many environmental health problems that are known to exist. In many situations the staffing needs of the university will require a different emphasis than the needs of the community as a whole.[15] For that reason such staffing should be the responsibility of the college and university administrations; it is quite unrealistic to think that these problems can be absorbed into the programs of the local or state department of public health.

The professional staff at the University of Minnesota presently includes a public health engineer, an industrial health engineer, a safety engineer, three health physicists, and three sanitarians. In addition, the research activities which are carried on by the Division of Environmental Health and Safety require a bacteriologist, a chemist, two sanitarians, a nurse, and several laboratory technicians. Such staffing is different from that found in a city of similar size. To date, very few universities have provided the professional staff that is considered necessary for an effective environmental health program.

The responsibility of a university to provide its own professional staff does not, however, exempt state and local public health officials from their concurrent responsibility. The official public health agencies need to provide consultative and advisory service to university administrators, and, more specifically, to the medical staff who have responsibility for the health problems of the university. Public health officials working cooperatively with directors of college and university health services can make a major contribution by giving leadership and offering technical assistance.

Every health department has a twofold stake in providing assistance with the environmental health and safety problems of colleges and universities in its area. There is an immediate and direct benefit in protecting a very large segment of the nation's population against a great variety of health hazards. Control of infectious diseases, prevention of exposures to toxic substances, lessening of the lifetime accumulative dosage to ionizing radiation, and prevention of temporary or permanent disabling injuries is as important for this population as for any other segment of the nation's manpower.

A second benefit, often unrecognized, but of even greater public health significance, is the long-term health education derived from exposure to a safe, healthful, environment. Through your technical and administrative support, these young citizens will have had the experience of living and working in an environment free of health and safety hazards. As they assume leadership roles in the community, your efforts will be rewarded because of a better understanding of the benefits of your public health programs.

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Mr. Bond is professor and public health engineer; Mr. Michaelsen is associate professor and industrial health engineer; Mr. Scheffler is instructor and safety engineer; Mr. Stauffer is assistant professor and senior sanitarian; and Mr. Wollan is instructor and health physicist; School of Public Health and University Health Service, University of Minnesota, Minneapolis, Minn.

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ENVIRONMENTAL HEALTH NEEDS IN NURSING HOMES

Bruce Underwood, M.D., F.A.P.H.A.

THE MOST urgent need in the nursing home field today is for a greater and wider dissemination and application of existing knowledge. This is particularly true with respect to environmental health needs in nursing homes. We have only to reflect for a moment to realize how vast is the available supply of information and how much already has been printed that could be used easily or be adapted readily for use in nursing homes. Think of the amount of time and effort that has been spent in developing the body of knowledge relating to hospitals, institutions, and buildings in general. Think of how applicable this body of knowledge and experience would be if adapted to the environmental health needs of nursing homes.

We know a great deal about prevention of accidents and fires, how to carry a person from a burning building, the proper care of buildings and sanitation, safe construction and proper equipment, and other aspects of environmental health and safety. The majority of nursing home personnel are hungry for such information.

Environmental health is a broad subject which encompasses such items as site selection, building structure, foundations, and construction. It includes general requirements relating to corridors, ramps, stairways, exits, doorways, shafts, chutes, elevators, and dumbwaiters. It includes water supply, electrical installations, lighting, heating, ventilation, sewage disposal, and other utilities. It includes fire extinguishers, sprinkler systems, fire drills, fire escapes, alarm systems, inspections, training, and other aspects of maintenance and operation. Much is known in all of these areas, but nursing home personnel generally do not have the benefit of this knowledge or even in many cases know of its existence.

Specifically, what is needed? There is a basic need for a variety of educational materials for nursing homes that will be easy to understand and to use. These should be practical and down to earth. Nursing home personnel are looking to the experts to help provide them with publications of "how-to-do-it" nature. The need for technical information is so great that even material that would make known sources for reading matter on various subjects would be hailed as a major contribution. Nursing homes are of so many different types and vary so greatly with geographical location, operational auspices, and financial support that it is difficult to prepare one set of materials that is applicable to and usable by all nursing home personnel. This problem is difficult but must be solved.

There is a growing need for consultative assistance to nursing homes in addition to provision of printed materials. Without consultants to follow up and assist with their use, written materials are of relatively little value. We cannot expect wide dissemination of information or broad application of knowledge unless there are individuals working directly with nursing home personnel to achieve the objectives set forth. It takes a good deal of personal explanation, workshop, and group activity to bring about improvement in environmental health as well as other aspects of nursing home care.

The need for training applies equally to nursing home staffs as well as to regu-

latory agency personnel. How often have I heard the latter groups speak of the immaturity, inexperience, and incompetence of nursing home personnel. On the other hand, I have just as often heard those working in nursing homes speak of the immaturity, inexperience, and incompetence of agency employees. This is not to say that all or even a majority fit these categories. More often the reverse is true. I am told that one can not be a clerk in a 5 and 10 cent store without some indoctrination and training. Yet, many nursing homes are operated and also are inspected by persons with no prior training or experience in this field. I am reminded of the sanitarian I knew who was formerly a restaurant operator. I think also of a restaurant operator who at one time was a sanitarian. These individuals were much better at their jobs as a result of their previous experience.

Technical assistance is essential. Knowledge of current practices and emerging trends, printed materials, consultation, and training does not replace the need for personnel with technical knowledge who can give assistance in depth. In many ways it has been proved that some actual on-the-job technical assistance helps both nursing home and agency staff do their jobs well. The great majority desire such assistance and are anxious to learn how to do their jobs effectively. It may take years of experience on the job to learn what can be taught in a short time by example and technical assistance.

It has been said that everyone knows what a nursing home is but that no one really knows what it is. There is truth in each of these conflicting statements. No two states have even the same definition of a nursing home. For our purposes, let us consider a nursing home as a facility for the accommodation of individuals who are not in need of hospital care but who are in need of nursing care and related medical services as prescribed by or performed under the direction of persons licensed to provide such care or services.

The patients in nursing homes are, in general, in the older age groups with the average age being well above 65 years. Two-thirds of the patients are women. Less than one-half can walk alone. One-third are incontinent. About one-half are mentally disoriented at least part of the time. They come to nursing homes because of a variety of conditions including cardiovascular disease, arthritis, rheumatism, fractures, paralysis, and senility.

Since the nursing home is also a home for these people, some of the following statements made by Walter K. Vivrette in the April, 1960, issue of Geriatrics are applicable:

"If we are to achieve an environment of maximum livability for older persons, with particular emphasis upon the continuance of independent living for the longest practicable period, there are several considerations to be held in mind. The environment should:

"Provide a quality and standard of environment equal to, if not better than, that to which the older person has become accustomed to in earlier life.

"Have maximum suitability to the conditions frequently observed among older persons, such as failing eyesight or hearing, slowing of gait, or general dwindling of energy reserves.

"In so far as possible, provide within the one single setting a maximum livability for a maximum number of years, a flexibility which accommodates the home to the dynamic processes of growth and aging, and to the concomitant ever changing needs and demands.

"Within practicable limits, have maximum adaptability to the less frequently observed conditions, such as wheelchair existence, blindness, or forgetfulness."

What are some of the specifics of a functional, safe, and sanitary environment in a nursing home? The site should be well drained with adequate sewerage, water, electrical, telephone, and gas facilities available or near the site. It should be relatively free from noise and objectionable odors and air

pollution. It should be remote from uncontrolled insect and rodent breeding areas.

The building should be of sufficient strength to support all dead, live, and lateral loads without exceeding the working stresses permitted for the materials of their construction. The foundations of the building should be sound and provide proper support for the footings, piers, and foundation walls. The construction, in general, should be of not less than one hour fire-resistive construction except that interior nonload bearing partitions, other than those enclosing corridors, stairways, and vertical shafts, may be of noncombustible construction without a fire resistive rating. Dead-end corridors should not be permitted. All patient rooms should open directly into a corridor. Hand rails of an approved type, mounted securely to the wall should be required on both sides of corridors used by patients. Ramps should be equipped with approved hand rails or banisters, sturdily mounted. Stairways should have evenly spaced risers and treads of a nonslip tread type. "Winders" should not be permitted. Stairwells in nursing homes should be designed or protected so as to prevent an individual from falling or jumping from them. Requirements relating to the numbers and kinds of exits should be complied with. Doorways for use by patients should be at least 3 ft 8 in. wide; 3 ft 10 in. is preferable.

There should be an adequate, safe, cold, and hot water supply with approved plumbing throughout the building. Requirements for electrical and lighting systems, heating, and ventilation should be met.

The required space can be classified into areas such as the following:

1. Administration and lobby.
2. Facilities for chapel, dining, recreation, pharmacy, physical and occupational therapy.
3. Patient rooms, nurses' stations, utility rooms, storage areas, special care rooms, and other nursing service facilities.
4. Various service facility space for food service, housekeeping services, general storage, record storage, mechanical facilities, bathing, lavatory, and toilet facilities.

Nursing homes as we know them today may not be the nursing homes as we shall know them tomorrow. Although dissemination and application of existing knowledge are of prime importance, this does not preclude the continued need for developmental research. Just because we know so much more than we actually apply is no reason not to continue to develop new and better methods of operation. We must continue to learn about current practices and situations for intelligent program development and action. This is true for all levels of government and for lay and professional organizations that have an interest and concern in nursing homes. We need special projects to demonstrate the actual advantages (and to determine the disadvantages) of various apparently good but unproved ideas. Research also consists of projects which would have as their primary purpose the planting of proved ideas so that they will become established and spread throughout all areas of our country.

At this time I would like to raise the question, "Should a nursing home exist by itself?" The primary goal of a nursing home should be to maintain and restore patients to the highest level of health possible. We realize that for many of the patients this facility will be their home for the rest of their lives. Patient needs will vary from time to time and may range all the way from intensive care commonly associated with that provided by hospitals to residential living on their own. In any event, for the time they are in the facility, it is home—and therefore it should be as homelike as is consistent with the level of care being given. Many people believe a facility that cares for older people

should be able to meet a wide range of needs. They believe a nursing home should not exist by itself but should at least have a unit for patients who are relatively well and who need only personal, group living, or domiciliary care. On the other hand, they believe that a home for the aged (one that is primarily for the accommodation of aged individuals who are not in need of assistance with the essential activities of living in a protected environment) should also have a nursing unit. Many people believe it is desirable to have hotel, apartment, and cottage style residential living units on the grounds and some believe there should also be a hospital unit of some kind. Such a combination facility creates special environmental health problems relating to inspection, maintenance, and operation as well as construction and equipment.

What are some of the methods and technics employed to meet the environmental needs of nursing homes? There are two basic approaches in so far as governmental agencies are concerned. One is through education and the other is through regulation.

Should not communities be encouraged to pass local ordinances and establish legal standards in excess of the minimum standards adopted at the state level for state-wide application? Generally speaking the more progressive state agencies and state nursing home associations are in complete agreement with this approach. Under these circumstances educational programs become paramount. Laws, regulations, and enforcement become necessary only for those nursing homes that are poorly operated and should be closed. The value of the educational approach versus that of the police officer is well known.

I believe the best job will be done when a qualified local health department is responsible for improving nursing home standards with the state agencies giving assistance and support. The trend is in this direction, that is, of giving local health departments more and more responsibility in the nursing home program.

Law enforcement procedures, grading, and inspections are also problems you know well. Nursing home and agency personnel responsible for nursing home regulations are just beginning to gain experience in this field. At the federal level we are developing a National Nursing Home Standards Guide to assist state and local agencies, associations, and other groups in developing and improving nursing home standards. The suggestions and recommendations in this guide will relate to such general areas as the establishment, maintenance, and operation of nursing homes. Of special interest to you will be the chapters on physical facilities as well as plant maintenance and operation. You will also be interested to know that a recent addition to our staff is a full-time engineer who will be responsible for the environmental health and safety aspects of nursing home care. We hope he will be instrumental in carrying on and promoting the activities I have outlined in this paper, including leadership and developing printed materials that state and local communities may adopt for their use. He will carry on his work primarily with state and local engineering counterparts working through the engineers in the Public Health Service Regional Offices.

I have mentioned the need for a greater and wider dissemination and application of existing knowledge. I have described general areas to be covered and the needs that exist as I see them. I have mentioned something of the methods and technics that are being used. Last of all I make a plea for simplicity, consideration, understanding, and sympathy with all who are engaged in the varied and complex problem of improving patient care in nursing homes. There is no limit to what needs

to be done—nor is there any limit to what can be done if we have the necessary love and understanding. Love has been called a warm intelligent concern for the welfare of others. Agency nursing home personnel, patients in nursing homes, and especially their families need more love and understanding. If we have the love of God in our hearts we will have the necessary love and understanding to do our job. The Bible says "God is love."

Dr. Underwood is chief, Nursing Homes Services Section, Chronic Disease Program, Bureau of State Services, U. S. Department of Health, Education, and Welfare, Washington, D. C.

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ENVIRONMENTAL HEALTH NEEDS FOR HOSPITALS AND MEDICAL CENTERS

Lawrence B. Hall, M.S.; Donald L. Snow, M.S.C.E., F.A.P.H.A.; Peter Skaliy, M.S.; and Harry Ettinger, M.C.E.

HOSPITAL and medical research center environments are of close and personal concern to each of us when it is realized that one out of every seven persons in the United States will be admitted to close association with these environments during the coming year. Actually, an even greater portion of the general population comes in contact with these institutions, for the number of hospital employees in this same period totaled 1.5 million, not including the growing cadres of investigators in the biomedical sciences who are affiliated with many of our hospitals and medical research centers. Responsibilities for the care and protection, including exposure to detrimental environmental factors, of the patient and staff member is assumed by the institution. The authors of this paper intend to discuss various aspects of the physical environs of hospital and medical centers and the control of chemical, biological, and radiological materials which may adversely affect the patient population or personnel. Inclusion of medical research centers within our area of concern is prompted by (a) the significant trend in a number of hospitals to include clinical research within their medical program and (b) the related problems that these medical centers share with the hospitals they embrace.

While real progress has been made in developing a uniform accident reporting

system among the nation's hospitals, we are aware of the lack of similar data collection efforts that could equally define the extent of their laboratory, foodborne, pediatric, surgical, and other hospital-acquired infections, as well as accidental overexposure to radiation or toxic chemicals. Such accidents have been reported in technical literature; however, incidents of laboratory infections, hospital epidemics, and other institutional epidemics which have not been reported are known to the authors. With few exceptions, such episodes are not required to be reported outside of the hospital. There is, in fact, reason to believe that a majority of these episodes go unreported, and the true magnitude of the problem in clinical areas and laboratories cannot be estimated closely at present.

One result of the research-slanted trend has been the introduction of new and sometimes complex clinical diagnostic and treatment procedures, which have widened the health needs in the physical environment of our hospital and medical centers far beyond our earlier concerns for water, wastes, laundry operations, and general sanitation. Today's frontiers extend to bacteriologic air quality in operating rooms, nurseries, and other critical patient-care areas; control of radioisotopes used in clinical and research activities; precautions necessitated by intensive concentrations of virulent organisms and toxic chemicals in laboratories; and such factors as hospital building maintenance. These considerations are complicated further by many of the common characteristics of clinical care and medical research activities among which are (a) high-density populations of persons in various stages of debilitation and susceptibility to infections and (b) above-average concentrations of potentially dangerous organisms. A different, but also important, concern is the need for environmental controls that will adequately minimize interference with research results. Large investments in collected data, in terms of professional personnel, expensive research materials, and special equipment and test facilities, can be lost or severely compromised by unsatisfactory or incomplete environmental controls.

In consideration of the needs of these institutions, we have narrowed our interests primarily to the inanimate environment. However, those personal habits and dress characteristics of patients and staff members that will alter the status of the physical environment also are included within our purview. Based on the authors' experiences at medical research centers and hospitals, four principal needs, fundamental to the development and maintenance of a healthful environment in hospitals and medical centers, have been identified. These needs are as follows: (1) Identification of potential health problems during the facilities planning stages and in improvement of environmental conditions by continued surveillance; (2) services of a trained environmental health specialist or group, supported by laboratory and specialized consultative services, responsible to the hospital's administrative head but working in close technical liaison with all chiefs of service and department heads; (3) emphasis on educating personnel to problems associated both with the patient-care and biomedical research environments; and (4) a continuing search for, and application of, standards based on health rationale.

To fulfill these needs, certain administrative devices should be set up within the organization to carry out the functions of planning of new facilities, supervision of details of their construction, surveillance of the existing structure and organization, finding and application of standards, and institution of corrective measures where they are needed.

Our present practice, largely, is to

leave this to the medical and nursing personnel. In the past, they have made many contributions to this field; but today, in the busy pinch of specialization, there is seldom anyone whose specific business it is to know if the louvers of the operating-room ventilation inlet are covered with a 16th of an inch of accumulated grime heavily infested with Clostridium perfringens, that clean linens are inadequately protected, or that the air bearing tubercle bacilli is moving out of the door of an isolation room into the hallway. Certainly in the experience of the authors, these and many similar situations are seldom getting the attention of the physicians, nurses, housekeeping and administrative personnel, or a committee whose interests may include the possible consequential effect of such conditions. In almost every instance, the demands of more pressing duties preclude the examination of these "minutiae."

Even if time permitted, the complexities of present day chemical, biological, and radiological agents prevent their potential dangers from being a spare-time responsibility of personnel with no "specific" training in the problem areas. Particularly the large hospitals and medical research centers need multidisciplined teams to be responsible for all facets of their environmental problems. The smaller institutions need at least one person with broad training in the several facets of the problem to carry out these functions. Professional competencies in hospital sanitation, radiological health, industrial hygiene and toxicology, and bacteriology and aerobiology must be present and in turn be complemented by an intimate knowledge of institutional administrative procedures and operational activities.

In the present administrative functions of most institutions will be found the practice of combined operation and inspection. The x-ray and radiological technicians monitor and judge the contamination and exposure of their own work. The housekeeping department inspects and judges, almost always by visual observation alone, the cleanliness achieved by that department's operations. It is only human nature often to be less critical of one's own work. Therefore, in institutions where these factors may, in the short or long view, influence life and death, the well proved principle must be observed of the "separation of operation and inspection." Thus, the work of the housekeeping, radiology, maintenance, and several other departments and services should be inspected by persons entirely outside their own ranks.

This is not to say that careful self-examination has no place in the institution; but where it is necessary, it should be formalized as much as possible and be backed up by inspection by others. Even in the smaller hospitals, self-examination should not be relied upon exclusively; for even here, the examination and evaluation of the environment is too complex to permit a casual approach by personnel not specifically trained.

In institutions of all levels of size and environmental complexity, the persons carrying out the functions of planning, direction, and surveillance of the environment need more than the normal foundation of training and experience in community sanitation. Certainly knowledge of the well established foundation provided by food, water, and milk sanitation serves as a good background. However, there also must be specialized knowledge of institutional administration; clinical and surgical procedures; and of chemical, biological, and radiological agents.

Supporting the local personnel, expert consultative service should be available to provide knowledge in depth based on the experience of other institutions and the latest research in the field.

In addition to the broad background

of training needed, a person in this field must have a sense of responsibility for the environment, "must be able to see with [his] mental eye the septic ferments"[1] that sometimes occur in the institutional environment. He must be so impressed with the importance of his mission that he will live with and for the job; yet he must not have his perception dulled by close association with the problem nor become defensive. In addition to his technical abilities, he will have to be part salesman to sell his work to those who have not yet been convinced of its importance.

To give these positions the stature and authority they must have, they should function administratively in a staff capacity—as the eyes, ears, and in some cases, the conscience of the administrator, and of individuals in charge of the institutional environment. Such persons should, perhaps, have nonvoting membership in infections, radioisotopes, and similar committees and have direct access to the administrator and to the chiefs of services.

How can institutions afford this service including not only the direct costs of the personnel but also the costs of changes of the environment that may be found necessary? More pertinent is the question how they can afford not to have the program, which will certainly be less costly than the legal suits that may result from hospital-acquired infections, the lives and time that may be lost, and the research results negated by contamination. In fact, many of the environmental changes are found to pay for themselves, for close study and the application of specialized knowledge can eliminate expensive materials and practices which are ineffectual, as well as specify those which are worth their cost.

In extremely small institutions, say hospitals of 25 beds or under, formal self-inspection is better than casual or subconscious observation. However, a number of these small hospitals or a few slightly larger ones might employ one man to serve several in this capacity as a joint employee. In some situations, the local department of health may find it possible to supply this service to the hospitals in its community. The larger institutions of 150-400 beds could profitably employ at least one man full time in this capacity while larger hospitals and medical research centers may well need a multidisciplined organization comprising several full-time specialists.

No matter what the size of the organization devoted to this problem, its sole responsibility must be the integrity of the institution's environment and this must be recognized to the end that the work will have the attention and respect of medical and administrative personnel.

The first opportunity for the organization to shape its future in a new environment will be in the planning stages. It is here that extreme care and foresight pay enormous dividends. Knowledge and experience applied to planning of the environment of a facility to be constructed can prevent costly errors and can reduce operational and maintenance costs. Environmental planning must be done through review of plans covering new construction or modifications to existing facilities, while there is still adequate opportunity for revision of the proposed construction to correct actual and potential deficiencies. Only through careful study of this type can, for example, air intakes to critical areas be so located as to minimize short circuiting of highly contaminated air from the laboratory exhaust. As an example of short circuiting, the authors have found as much as 4 per cent of the particulate matter from the exhaust of a well designed, modern hospital reappearing in the surgery air inlet. This amount is probably exceeded in other situations. Many other potentially dangerous problems can be avoided by planning. Special equipment such as hoods, sterilizers, and incinerators can be spe-

cified during planning when design standards, based on hazards associated with the activity, can be applied.

Although development of a thorough systematic review of plans will minimize or preclude many environmental deficiencies, planning must be complemented by continuing surveillance to insure that operational short cuts do not introduce additional environmental hazards. Wherever possible, quantitative data defining environmental base lines should be developed to evaluate environmental changes without resorting to rule of thumb or traditional practices. This is of considerable importance when it is realized that even standardized clinical care equipment such as delivery room resuscitators can be indicted in disease outbreaks.[2]

Questions that should be evaluated may include the following: What is the number of viable organisms normally present per cubic foot of air in an operating room? What variation should be anticipated under normal conditions? What are similar norms for other critical areas such as nurseries, sterile rooms, and infectious laboratory areas? What epidemiologic inferences can be drawn from changes in normal levels?

Protection of the institutional environment cannot be confined solely to the organization with the basic responsibility, but it must be carried on with an enlightened and conscious effort by every staff member. Some amount of staff training, then, is necessary.

In the past, education or training usually has been confined to instruction of kitchen personnel in the proper food handling procedures, alerting housekeeping to potential hazards and necessary precautions for waste handling, and training nursing attendants in basic bedside sanitation. All of these are necessary in any environmental health program. However, staff assistance both in program implementation and in acceptance of rigorous environmental controls can be gained only if all professional personnel are kept aware of the problems of environmental health. Plant engineers should know why design requirements, which may be unusual and uneconomic when based on traditional design criteria, are required due to their effect upon critical areas of an institution's environment. The necessity for special ventilation equipment should be explained to research personnel in terms of biological, industrial hygiene and toxicological experience. Clinical personnel should be alerted to the importance of limiting traffic flow in and out of critical areas so that design air flow patterns are not reversed and so that contamination is not transported between areas. Even some members of the medical and nursing staff must be reminded constantly that wounds and the newborn are not to be handled with bare hands, that proper scrub-up and dress is mandatory for even the shortest visit to certain critical areas, and of many other precautions that are all too frequently bypassed under the pressure of day-to-day work demands.

Subprofessional personnel need training as well. Seminars should be held in order that housekeeping and maintenance personnel may understand why certain cleaning and building maintenance procedures are required instead of the previously used criteria of general appearance. Bacteriologically satisfactory wash-up and isolation procedures should be taught to nurses' aids and practical nurses.

Seminars, meetings, and formal lectures are useful; but a continuing barrage of stimulating information should be used to keep the staff alert to dangers from the environment. Posters, exhibits, newsletters, and contests all have an important place in reducing human errors to a minimum. Last, but not least, to obtain any degree of success, the hospital administrative structure must be made aware of the justification for these

measures and must be shown how they may actually pay for themselves in the long run.

One of the greatest obstacles, however, to improvement of the institutional environment is the almost complete lack of standards in this field. Almost universally, reliance is placed on appearance. A floor "looks" clean, linens are "clean" because they are white, air is assumed to be clean because we cannot see it. Perhaps we can use the analogy that although most water and milk "look" clean, we have learned that we cannot rely on their appearance if we are to avoid water and milk-borne epidemics.

Riley and Wells,[3] in their classic work on air hygiene, showed that the tubercle bacillus can be air-borne and can infect laboratory animals. Many other biological agents in the inanimate environment have been implicated or suspected of being capable of similar transmission. In spite of this, there are, as yet, no satisfactory standards for measurement, much less for allowable levels of biological contamination of institutional air.

Standards over the years have been developed for water, food, and milk based on our experience with these products as found in actual practice and their relation to the incidence of disease. Standards of medical and surgical care have made marked advances in response to research in these fields. Similar standards for the environment of institutions have not kept pace.

For many years, the specifications for the ventilation systems of institutions have dealt only with the parameters of temperature and humidity. If air cleanliness was considered at all, it was largely in terms of the smudges which developed on ceilings and walls adjacent to air outlets. Means are now at hand, however, for examination of the biological quality of air and for the evaluation of the efficiency of biological air cleaning devices.[4-6] Despite the availability of these technics of measurement, standards, although suggested, have not yet been fully established.[7] Much more work needs to be done to relate the actual values of air cleanliness to infection rates.

Perhaps even less progress has been made in establishing standards for the cleanliness of surfaces in institutions. It is possible to quantitate the biological contamination of surfaces in the institutional environment with some degree of reproducibility,[8] but no standards have been validated. In fact, there is insufficient evidence upon which to base judgment of the relative importance of different surfaces—such as floors, walls, ceilings, and fomites. One of the greatest gaps in standards is that for germicidal agents. This problem is so complex in its many ramifications and interpretations that few, if any, real standards exist nor are they likely to in the next few years.

At present, the best environmental standards for institutions are probably established in the radiological field. Here, well known and specific standards are enforced, although further research and experience may further define these standards. Similarly, some standards are available as criteria for the presence of many chemicals in the institutional environment; but these, based on normal human experience, may have to be further refined in reference to the special institutional populations.

The lack of standards that can be applied to the institutional environment is and will remain a major handicap to the development of an optimum environment until well justified, easily measured standards can be established. This can be done only by a coordination of research in many fields—including those of bacteriology, epidemiology, chemistry, engineering, physics, radiology, and many others. Still largely untapped and offering a large potential for acquiring this useful kind of information are the

programs of medical research in our hospitals and medical centers, our clinical pathology laboratories, and our state and federal health facilities. A portion of their efforts must be devoted to the development of adequate, but not excessive, standards for the biological, chemical, physical, and radiological standards of our institutional environments, if human illness and death from these sources is to be held to a minimum.

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Mr. Hall is chief and Mr. Skaliy is bacteriologist, Biophysics Section, Technical Development Laboratories, Technology Branch, Communicable Disease Center, PHS, U. S. Department of Health, Education, and Welfare, Savannah, Ga. Mr. Snow is consultant, Research Facilities Planning Branch, and Mr. Ettinger is senior assistant sanitary engineer, Sanitary Engineering Branch, Division of Research Services; National Institutes of Health, PHS, Department of Health, Education, and Welfare, Bethesda, Md.

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Air Cleaning Course for Experienced Engineers

Harvard School of Public Health is to conduct an intensive course on air cleaning June 19-23. Lectures and laboratory sessions will be held on basic theories and principles of aerosol and gas collection; stack sampling methods and data evaluation; and performance of typical air and gas cleaners. Preliminary sessions will afford a review of basic engineering principles in order that coverage and advanced material may be as comprehensive as possible.

Enrollment is restricted to those actively engaged in the practice of industrial hygiene engineering or air pollution control, and is limited to 40 persons. Tuition for the course is $150. A registration fee of $50 must be submitted with each application. For academic or field experience requirements and further information write to: Leslie Silverman, Sc.D., at the school, 55 Shattuck Street, Boston 15, Mass.

The changing world of public health and some of the consequences to be anticipated are the themes on which this paper comments. Readers should reflect particularly on technological change and its promise for public health.

THE CHRONIC DISEASES AFFECT OUR ECONOMY—A LOOK AT THE FUTURE

Albert L. Chapman, M.D., M.P.H., F.A.P.H.A.

NO NATION is more enamoured of its standard of living than the United States. Since uncontrolled disease and disability adversely affect our ability to sustain our standard of living, I am confident that efforts will be intensified in the near future to determine the basic causes of the chronic noninfectious and malignant diseases and to apply more effective methods for their control. The importance of production to our standard of living can be better understood by examining the formula $S=\frac{P}{C}$ in which S represents our Standard of Living, P the number of Producers, and C the number of Consumers.

Certain factors in recent years have tended to increase the number of consumers. There has been an upsurge in the birth rate and longevity has steadily increased. There also have been factors which have tended to decrease the number of producers—earlier retirement, a prolongation of the average period of education, and a shorter work week.

The reason why our standard of living, under the impact of these adverse influences, has continued to improve rather than suffer a severe decline is that technological progress until now has been able to increase the number of units of production per man-day. How long this adverse situation, if allowed to continue, can be successfully compensated is anyone's guess. It poses a continuing threat to our way of life.

There are several important ways in which the chronic diseases adversely affect the economy. According to the National Health Survey there are, in our country today, approximately 69 million persons with some chronic disease or impairment, 17 million of whom are limited in their activities by a chronic condition, 1.1 million are confined to hospitals.

The estimated prevalence of diabetes in the United States is 1.5 million known cases and an estimated 1.4 million undiscovered cases.

Glaucoma is the major cause of blindness in the United States. The possibility of the development of glaucoma increases with advancing age, a sharp rise occurring in the age group from 50 to 54 years of age. We have 120,000 known cases of this disease, and it is estimated there are 1.2 million unknown cases in persons over 40 years of age.

It is estimated that at least 10 million

people in the United States have some form of cardiovascular disease. While their illness incapacitates these people to a varying degree, many are unable to work at all. Others are forced to work part time or at less demanding work, which means less pay.

First of all, once these chronic diseases occur they last a lifetime, and as a rule they are not cured. At best they can be contained. Because of these characteristics, periodic treatment is required. This makes necessary the commitment of costly goods and services which otherwise would be available for more constructive purposes.

Second, they often strike down and incapacitate breadwinners at a time when they are at the peak of their usefulness.

Finally, many victims of the chronic diseases live on as consumers but can no longer be producers because of their disabilities.

This tends to unbalance the equation: $S=\frac{P}{C}$.

The number of consumers remains the same or increases, while the number of producers decreases. This tends to lower our standard of living.

Some awareness of this threat to our economic health is evidenced by the steady growth in dollar support for the National Institutes of Health—the basic research arm of the Public Health Service—during the last 13 years.

In 1946, the budget of the National Institutes of Health was approximately $2,846,000. In 1959, it was $294,383,000. Research budgets, other than those of the National Institutes of Health, have also shown large increases.

Support for the application of research findings on the other hand has been significantly uninspired. The reasons given for this lack of enthusiastic support are varied and many, but none have the ring of conviction. Spending millions for research and pennies for application is like buying bread and not eating it, since medical research remains sterile until the results of research are applied and actually bring about a betterment in man's health.

As we contemplate today's health problems and seek solutions to these problems, it can be helpful to take a cue from industry. It is hard for an inefficient industry to survive in today's highly competitive society. A successful industry constantly strives to keep its various stages of product development and marketing in balance. Equal emphasis is placed on all phases of the industrial process: (1) research and development, (2) applied research (the pilot plant), (3) production, and (4) sales and distribution. No industry can translate even the most ingenious invention into dollar profits if the invention is not whipped into marketable shape through applied research; produced in large quantities so that it can be sold at a competitive cost; and sold and distributed by a highly efficient sales force using the most modern methods of mass motivation.

How many potentially applicable medical and scientific discoveries are not being widely applied today because of a failure to achieve and maintain the proper balance in all phases of the development and marketing of health products? We know that if children with rheumatic fever take penicillin prophylactically there is little chance that they will get rheumatic heart disease. Yet, studies show that children with rheumatic fever by and large are not taking penicillin regularly. Where is the weak link in our chain?

We are told that half the people in the United States who have diabetes are not aware of it. Specific, inexpensive tests for detecting diabetes have been available for many years. Again, where is the weak link?

There is a workable test for early

cancer of the cervix. In 1957, 12,900 women died of cancer of the cervix because cancer was found too late. Will as many women die of cancer of the cervix in 1959 as in 1957? If so, will we be able to identify and strengthen this weak link in our chain to control this disease?

One way for a community to identify and strengthen these weak links would be to call a board of directors meeting for the purpose of appraising local health problems and tabulating the resources needed to improve the local health situation. On the board could be the health officer, the president of the local medical society, representatives of local hospitals, voluntary health agencies, welfare agencies, and others charged with responsibility for safeguarding the health of people. It might be well for the health officer, if he would, and others, if he would not, to put questions such as those I have raised to this community board of directors.

I fear that if such a community board of directors does not soon concern itself with these questions, one day the stockholders may ask even more penetrating questions.

The trouble is that so many individuals, so many agencies, and so many institutions in every community are directly or indirectly concerned with the provision of health services that responsibility for failure cannot be pinned down to any one of them. The development of some semblance of order out of the present chaos must precede any marked improvement or expansion in the provision of modern types of health services. Since so many people are partly responsible for community health, the first step to be taken in restoring order to the community scene is to develop a local plan for providing coordinated and comprehensive community care.

Only through meeting together on a voluntary basis and discussing the provision of community health services in an objective fashion can the responsibility for specific segments of health care be definitely assigned to one or more community groups. A movement in this direction may be seen in the beginning coalition of the interests of hospitals, nursing homes, rehabilitation centers, and, occasionally, health departments in a few communities. This is a start. It may even represent a trend that hopefully will eventuate in the development of sensible, workable plans for coordinated community care throughout the nation. We have failed signally to sell the value of preventive medicine to the taxpayer—to the man on the street. He has bought research, but he has not bought application.

One of the biggest handicaps from which we public health workers suffer is our awkwardness, our ineptness, in changing attitudes, both our own and others. People tend to support only that which they can understand. Obviously, we have not had marked success in getting people to understand the importance of applying preventive health knowledge.

This may be due to our own attitudes —which may need changing. For example:

1. Do we rationalize our failure to gain support by saying to ourselves, "People are stupid! If they were not, they would back us up?"
2. Or, do we insist on presenting our story to the public in polysyllabic words lest we perchance be identified with those who sell goods in the market place?
3. Or, do we fail to appreciate the importance of "the laying on of hands"—of providing tangible services that laymen can understand and will appreciate? Have we instead provided an unacceptable substitute made up of equal parts of consultation, advice, and often ineffective pamphleteering?
4. Or, have we been too busy or too indifferent to seek aggressively to involve the many other community agencies, organiza-

tions, and groups in our health planning, and have we thereby deprived ourselves of understanding supporters, the lack of which we constantly decry?

These are interesting questions, the answers to which may help our self-analysis.

However, people's attitudes other than our own also constitute obstacles to public health progress. In fact, if there is one single ability which most typifies an effective public health worker, it is the ability to change other people's attitudes without offending those whose attitudes are being changed. Belated recognition of this fact is largely responsible for the current rash of motivational research in the public health field—something that industry found imperative to undertake many years ago.

The human tendency to "stand pat," to eschew change, is a defense mechanism built into people to protect them from prematurely embracing the many "isms" and half-baked ideas which constantly bombard them. Unfortunately, it also makes them impervious to many excellent ideas and soundly conceived plans. Modern advertising methods take this into account. They are specifically designed to change attitudes as quickly as possible—to shorten the lag period of acceptance—to anesthetize the inborn defense mechanism which prevents the acceptance of new ideas. It is vital to the success of our public health efforts to recognize the need to learn how to motivate others to change their attitudes —skillfully and effectively, albeit with the dignity which characterizes our profession. And, we must be amenable to change ourselves—to the acceptance of new and worth-while ideas.

Our society has never been in a greater state of flux. It is more economical today to use a 20 cent syringe once and throw it away than to sterilize it and use it again. One man manipulating a system of electronic controls in a factory can do the work formerly done by 75 men. Automation, mass production, reducing hand labor to a minimum, has become a way of life—the alleged new road to industrial survival.

I have neither the competence nor the desire to comment on the merits or demerits of either automation or mass production. However, I believe it is merely good reporting to say that it looks as if both were here to stay.

One may ask, "Of what interest is automation and mass production to me?" I believe that laboratory directors will be interested for they eventually will have to turn more and more to automation and mass production to be able to handle the potential analytical load which undoubtedly will be laid upon them as soon as a few more attitudes have been changed. The trend toward periodic physical and screening examinations is definitely upward. Can the average laboratory efficiently and economically handle a tenfold increase in the present number of laboratory tests that are being performed? Tests that are an integral part of all physical and screening examinations?

Consider the increased volume of laboratory work that will be needed as soon as preventive medicine really hits its stride. When effective tests for arthritis are developed, millions of additional tests will have to be done each year. When the time comes that all eligible women are examined periodically for evidence of cervical and uterine cancer, will present methods of organization permit the handling of the increased work load? In the not too distant future there is every reason to believe that accurate, economical diagnostic and screening tests will be perfected for many diseases not now subject to routine laboratory study—for cancer of various sites of the body, for cirrhosis of the liver, for nephritis, in fact for all disease states toward which laboratory workers may be willing to direct their attention, and to

which they may be willing to commit their resources.

There are signs that changes along these lines already are occurring in laboratory practice. The clinitron, the cytoanalyzer, and the autoanalyzer, in a sense, are straws in the wind—the forerunners of a new emphasis on quantity and automation in laboratory operation.

What role in future laboratory work will spectroscopy play? And electrophoresis? And paper chromotography? The vistas of tomorrow's laboratory worker are boundless!

Nor will the laboratory director be able to limit himself any longer to the workbench, the test tube rack, and the Bunsen burner. He will have to become a teacher, a trainer, a researcher, a promoter, and an administrator, as well as an analyst. He will have to recruit and train a veritable army of medical technicians. He will have to obtain and commit a great deal more money to research projects. He will have to promote greater interest in the work of his profession and a better understanding of the bread and butter importance of what his laboratory is doing. And, finally, he will have to become better versed in administration—the effective handling of personnel, the reduction of costs, the maintenance of an ever-increasing output at lower unit cost.

Public health is rapidly discarding its swaddling clothes. By its early successes it has intensified the problem of aging and brought the chronic illnesses into the spotlight of national attention. In drafting plans for an all-out assault on the chronic diseases as well as in the assault itself, public health administrators will have to rely heavily on laboratory workers. As they have risen to meet past challenges, I am sure they will rise to the challenge of today's chronic illnesses with vigor, imagination, and increasing effectiveness.

Dr. Chapman, formerly chief, Division of Special Health Services, is now chief, Division of Accident Prevention, Bureau of State Services, Public Health Service, Washington, D. C.

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The apparent relationship between marriage and mortality is examined critically by Dr. Sheps. She concludes that things are not always what they seem, and that many factors may influence the movement of mortality ratios. An interesting exercise in logical thinking.

MARRIAGE AND MORTALITY

Mindel C. Sheps, M.D., M.P.H., F.A.P.H.A.

In 1955, a well known newspaper[1] carried a headline: "U. S. Statistics Prove It . . . Marry and Live Longer." With the same logic, they might have continued: "and once you are married, hold on to your wife!" The "statistics" were official United States mortality rates for 1949-1951[2] which were lower at practically every age for married men and women than for single, widowed, or divorced persons. These rates have been discussed in some detail by Shurtleff,[3] who pointed out that the lower mortality rates among married persons are likely to be due in part to a process of "selection." Healthy persons are more likely to marry (or to remarry) than are those with chronic cardiac or neurologic conditions or with other disabilities that affect life expectancy. As compared with married persons, therefore, the "single" group will experience a higher mortality rate. Also, since there is a greater tendency that healthier widowed and divorced persons will remarry than the less healthy, it is the healthier group that reappears in the statistics as married.

Relatively fewer deaths among married persons had been observed previously.[4] In addition to the effects of selection, explanations suggested for this phenomenon have included errors in classification of marital status in census figures or in death certificates, as well as a possible real "protective" effect associated with marriage.[3,4]

The 1949-1951 figures have now been reexamined by Kraus and Lilienfeld[5] who stated that the outstanding feature of the statistics is a "great relative excess in mortality among the young widowed group." They concluded that selection or misclassification in census or mortality statistics could not explain many of the differences they had noted as affecting widowed persons aged 20-35 and proposed several alternative hypotheses to account for an "increased mortality risk" in this group.

If being widowed in the twenties or early thirties is really associated with an especially high risk of mortality, fascinating and potentially important problems for further study come to mind at once. It may be well, however, to look further into the 1949-1951 statistics before assuming that such an association has been shown to exist.

The Mortality Rates

Table 1 shows average annual mortality rates by age, sex, race, and marital status as calculated[2] from the deaths occurring in 1949-1951.* The married

* The rates for single persons under age 20 have been omitted because they apply to ages 0-20 while the rates for the other three categories include ages 14-20.

Table 1—Average Annual Death Rates, by Age, Marital Status, Color and Sex—United States, 1949-1951* (per 100,000 Population in Each Group)

Color, Sex, and Marital Status	Age								
	<20	20–24	25–34	35–44	45–54	55–59	60–64	65–69	70–74
White Males									
Married	145	128	147	322	868	1,716	2,529	3,653	5,457
Single	—	196	309	736	1,629	2,851	3,988	5,410	7,805
Widowed	90	496	633	928	1,734	2,631	3,621	4,851	6,818
Divorced	196	333	533	1,140	2,246	3,562	4,796	6,604	9,223
White Females									
Married	84	71	100	215	511	961	1,506	2,329	3,879
Single	—	91	175	320	623	1,088	1,588	2,435	4,187
Widowed	418	263	266	395	728	1,187	1,810	2,697	4,406
Divorced	141	143	223	391	718	1,285	1,998	3,284	5,773
Nonwhite Males									
Married	248	281	372	674	1,494	2,612	3,337	3,646	5,043
Single	—	418	818	1,813	3,362	5,428	6,176	7,105	9,405
Widowed	1,111	725	1,444	1,986	3,733	5,490	6,451	6,053	7,797
Divorced	753	418	972	1,545	3,042	4,738	5,896	6,714	8,616
Nonwhite Females									
Married	205	222	328	638	1,258	2,003	2,630	2,626	4,262
Single	—	315	601	1,185	2,018	2,767	3,917	3,525	5,651
Widowed	606	506	776	1,230	2,292	3,526	4,434	3,634	5,295
Divorced	339	326	490	882	1,678	2,728	3,950	3,622	6,574

* Source: Table 2 in Reference 2.

group had the lowest rate in practically all instances. Within a marital category, in each race and sex, there was a steady increase in mortality rates with increasing age if we exclude those under 20. Widowed persons had the highest rates in many of the younger groups, and second place was taken either by the single or by the divorced without a definite pattern.

Are the Data Reliable?

Census Data

The base for each calculated mortality rate was an estimate of the corresponding 1950 population derived from a sample of 19.95 per cent of the population.[6] On examination, these estimates reveal some curious features. Although the census takers were instructed to sample every fifth person, the instructions were not always followed correctly.[7] In the end, the sample included 20.03 per cent of the females and 19.71 per cent of the males in the population over the age of 25 years instead of 20 per cent of each group* and the proportions varied in different parts of the country. Rather than attempt to correct for the unknown and variable errors in the sample, the Census Bureau multiplied each estimate by five.

Moreover, the proportions sampled apparently varied according to marital status in each sex. Table 46 in the census report[6] shows the total number

* The difference in the proportions sampled of the two sexes is significant at $P < 0.001$ when tested by the standard error of this difference.

of single,* married,† and widowed or divorced‡ males and females as obtained from the complete population count. In Table 2, these numbers are compared with the estimates obtained from the sample. The apparent relative underestimate of widowed or divorced males in the sample was more than twice the underestimate of single males. In contrast, the total number of women was slightly overestimated, but the sample estimate of "single" women was lower while that for "widowed or divorced" women was higher than the total count.

The differences shown in Table 2 would not in themselves affect the mortality rates greatly. But we cannot know how evenly the errors are distributed in the separate age and race groups. It is known[8] that the total census enumeration missed larger proportions of children, of young males, and of nonwhites, than of other persons in the population. It is likely that unequal errors affect the marital estimates for different age-sex-race subgroups. For example, the estimates (Table 3) for 1950 include for age 14 the incredible figures of 1,670 male widowers, 1,320 divorces and 6,660 married boys, as compared with a few hundred 14-year-old girls who had been widowed or divorced. Available United States marriage statistics are in conflict with these estimates and conform better to one's expectations. In 1950, for example, 24 states reported 937 marriages where the bride was under 15 years old and 45 marriages where the groom was under 15.[9] Not surprisingly, young marriages are usually[10] reported in small numbers with considerably fewer among boys than among girls.

Another curious feature of Table 3 is the size and trend of the ratio wid-

* Defined to include persons whose only marriage had been annulled.

† Defined to include "separated" persons.

‡ It is necessary to treat the "widowed and divorced" as one group in comparisons between the sample estimates and total population count since the latter does not list them separately.

Table 2—Comparison of Total Males and Females Aged 14 Years and Over According to Marital Status in Complete Population Count and in Sample Estimates—United States 1950*

	Total Count	Sample Estimates	Sample Minus Total	
			Absolute Number	As Per cent of Total Count
Males				
Single	14,518,079	14,399,840	−118,239	−0.81
Married	37,399,617	36,866,055	−533,562	−1.43
Widowed or divorced†	3,393,921	3,335,210	−58,711	−1.73
Total	55,311,617	54,601,105	−710,512	−1.28
Females				
Single	11,454,266	11,418,335	−35,931	−0.31
Married	37,503,836	37,576,800	+72,964	+0.19
Widowed or divorced†	8,084,315	8,107,160	+22,845	+0.28
Total	57,042,417	57,102,295	+59,878	+0.10

* Source: Tables 46 and 102 in Reference 6.
† These categories are not presented separately for the total population count in Table 46.

Table 3—Sample Estimates of Widowed and Divorced Persons by Age and Sex—United States 1950*

Age	Males			Females		
	Number Widowed	Ratio Widowed/ Married	Number Divorced	Number Widowed	Ratio Widowed/ Married	Number Divorced
14	1,670	0.25	1,320	565	0.08	215
15	1,475	0.21	955	610	0.03	330
16	1,175	0.15	750	550	0.01	885
17	810	0.05	575	895	0.01	2,285
18	905	0.02	820	1,455	0.01	5,065
19	630	0.01	1,810	1,750	<0.01	7,750
(15–19)	(4,995)	(0.03)	(4,910)	(5,260)	(0.01)	(16,315)
20–24	9,060	<0.01	50,855	25,280	0.01	97,090
25–29	15,485	<0.01	103,255	57,490	0.01	158,990
30–34	20,945	<0.01	116,180	91,945	0.02	176,175
35–39	36,215	0.01	129,975	155,500	0.03	197,455
40–44	58,650	0.01	134,110	253,750	0.06	190,410
45–49	92,070	0.02	130,940	391,825	0.11	165,980
50–54	148,685	0.04	119,850	575,770	0.19	136,205
55–59	210,065	0.07	97,790	738,245	0.30	96,830
60–64	285,075	0.12	75,315	898,415	0.49	64,115
65–69	358,880	0.20	53,995	1,068,905	0.84	40,255
70–74	357,560	0.33	30,370	958,730	1.46	19,630

* Source: Table 103 in Reference 6.

owed/married. Contrary to the expectation that this ratio would increase with age, in the sample census data it is very high for young boys and decreases until age 30. The ratios for females, except at the earliest ages, change according to the expectation just outlined.

There seems therefore to be very good reason for doubting the census data for marital status by age and sex. One must admit the possibility that relatively large errors affect some subgroups and, more generally, that the errors in various groups are not necessarily equal. In addition to incorrect answers,[5] mistakes made by interviewers and errors in coding, punching or tabulating age, sex or marital status may all contribute to final misclassification.

Mortality Data

The rates were computed[2] from those United States deaths registered in 1949-1951 where the death certificates gave the necessary information about marital status. Errors of reporting or tabulating sex, age, or marital status may have occurred in these mortality data[4,5] but these possibilities cannot be checked at present.

Possible inconsistencies of classification that cannot rightly be called "errors" but would affect the rates also come to mind. For example, motor vehicle and other accidents were among the causes of death where the widowed suffered much more than the married.[2] It is likely that when both partners to a marriage are fatally injured in the same accident the earlier death is

counted as married and the second as widowed. Since both were in the married population, this would serve artificially to decrease the married mortality rate and to increase the widowed mortality rate. The same pattern might be expected in other deaths occurring close together, as in the case of deaths due to acute infectious diseases.

Despite these questions about the reliability of the data, the consistent tendency[2,4] of mortality rates of married persons to be lower than those of all other marital classes makes it desirable to attempt to examine the trends more closely.

Relative Mortality Ratios

The differences between the mortality rates in Table 1 are often[3-5] evaluated by calculating "relative mortality" ratios such as are shown in Table 4. Each number in the table is the ratio of the observed mortality rate for a nonmarried group to the observed mortality rate for the married population in the same age-sex-race category.

The calculation of relative mortality ratios is a common and traditional method of comparing several sets of rates. But mortality ratios have serious limitations when used to characterize trends. A set of mortality ratios in any row of Table 4 is the result of changes in the denominator (i.e., recorded mortality rates for the married group) as well as of changes in the numerator. Since the numerator and denominator are both variable and not greatly disparate in size, regularity of behavior should not necessarily be expected from these indexes. For example, Kraus and Lilienfeld[5] laid considerable stress on comparisons of the magnitude of mortality ratios in the two sexes, at different ages and in different diseases. Many of their arguments depend at least in part on expectations of regularity in mortality ratios. Thus they concluded that misclassification in census or mortality statistics was unlikely to play an

Table 4—Ratios of Death Rates for Nonmarried Groups in Table 1 to Rate for the Married Group—United States 1949-1951

Color, Sex and Marital Status	Age								
	<20	20–24	25–34	35–44	45–54	55–59	60–64	65–69	70–74
White Males									
Single	–	1.5	2.1	2.3	1.9	1.7	1.6	1.5	1.4
Widowed	0.6	3.9	4.3	2.9	2.0	1.5	1.4	1.3	1.2
Divorced	1.4	2.6	3.6	3.5	2.6	2.1	1.9	1.8	1.7
White Females									
Single	–	1.3	1.8	1.5	1.2	1.1	1.1	1.0	1.1
Widowed	5.0	3.7	2.7	1.8	1.4	1.2	1.2	1.2	1.1
Divorced	1.7	2.0	2.2	1.8	1.4	1.3	1.3	1.4	1.5
Nonwhite Males									
Single	–	1.5	2.2	2.7	2.3	2.1	1.9	1.9	1.9
Widowed	4.5	2.6	3.9	2.9	2.5	2.1	1.9	1.7	1.5
Divorced	3.0	1.5	2.6	2.3	2.0	1.8	1.8	1.8	1.7
Nonwhite Females									
Single	–	1.4	1.8	1.9	1.6	1.4	1.5	1.3	1.3
Widowed	3.0	2.3	2.4	1.9	1.8	1.8	1.7	1.4	1.2
Divorced	1.7	1.5	1.5	1.4	1.3	1.4	1.5	1.4	1.5

important role in producing the trends observed in Table 4 because, to explain the relatively high ratios for males and for younger persons, ". . . whether the errors were on death certificates or census returns or both, they would have to be proportionately greater for men than for women, and would have to be much fewer relatively with advancing age."[10, p. 211]

In the Appendix, it is shown that, assuming that any two age or sex groups have exactly equal relative errors in census statistics and in mortality classifications, resultant mortality ratios for the widowed would vary according to the ratio widowed/married in each particular population group. Since (Table 3) the ratios widowed/married were not constant, and moreover census errors were probably not equal, there is no reason to expect that relative mortality ratios calculated from these statistics will be of equal magnitude.

Possible Effects of Selection on Mortality Ratios

One selective factor, mentioned earlier, which favors married as against single persons, is the smaller likelihood of first marriage for persons in ill health. It is reasonable to suppose[3] that the discrepancy in mortality rates produced by this factor should be greatest at those ages when first marriages usually occur, and should be less marked at higher ages. But selection favoring the married groups probably continues in later life both through the more frequent occurrence of widowhood in lower socioeconomic groups and through selection in remarriage. Such factors would not only favor married as compared with widowed and divorced groups but would also favor married as compared with single groups, which were not being affected by a similar selective process. In this case, the direction of change with age in mortality ratios based on the married groups would depend on the relations between the various factors in question.

To eliminate the effects of subsequent selective factors favorable to married women, Zalokar[11] compared mortality rates of single women with those of "ever-married" women, i.e., of married, widowed, and divorced women added together. In this comparison the relative mortality of single women decreased with age before age 75. This observation supports the notion that selective factors may play an important role in producing the observed excess mortality in the nonmarried groups. It would not be surprising if the selective factors operated differently in the two sexes and in different racial and marital groups at various ages, producing dissimilar patterns in mortality ratios.

Measuring Increased "Risk"

The identification[5] of young widowed persons as subject to especially high mortality risks resulted from equating relative mortality with risk. The inference was based on the observation that the highest mortality ratios were seen among widowed persons aged 20-35 (Table 4). It may be questioned whether, in these circumstances, relative mortality is an appropriate measure of increased risk. A mortality risk is generally expressed as the probability that a person in a given category will die in a defined period. Concretely, it is estimated by the proportion of people in that category who have died during the defined period. The principle underlying the calculation of such probabilities or proportions is that the denominator should consist of those who experience or are exposed to the risk that is being estimated, whether the number exposed is the actual count or an estimate.[12]

The denominator of a relative mortality consists of the observed deaths

per 100,000 married persons. This denominator is not related to any persons who might be exposed to added risk associated with widowhood, with divorce, or with being unmarried. As has been proposed elsewhere,[13,14] an "increased" risk associated with a deleterious effect may be estimated as follows. If the rates for married persons depict the best results under given circumstances, then deleterious effects could be felt only by those who would survive in the absence of harmful factors. The size of this population at risk may be estimated from the survivors in the married group. For example, out of 100,000 married white males aged 70-75, there were $100,000 - 5,457 = 94,543$ survivors per annum. Since there were only $100,000 - 7,805 = 92,195$ per 100,000 widowed survivors of the same race and age, the widowers suffered an excess risk of $\frac{94,543 - 92,195 = 2,484}{94,543}$ per 100,000 potential survivors.

The value of these absolute indexes of increased risk may be judged, in the present context, not only on their logical basis but also by their agreement with what we know of mortality data and by the help they may give "in the understanding of the phenomena under study"[15] as compared with the more commonly used mortality ratios.

Indexes of absolute risk were calculated, as described, from the mortality rates in Table 1, and are presented in Table 5. The indexes for the several marital groups in any age-sex-race category have the same rank-order as the mortality ratios, and indeed as the rates themselves (Table 1). The absolute indexes have a greater and more consistent tendency to be adverse for males and for nonwhite groups than the mortality ratios. The most striking feature, and the greatest contrast to Table 4, in this analysis is the consistent and marked increase in the risks at older ages. This analysis therefore suggests that the im-

Table 5—Excess Risk per 100,000 in Nonmarried Groups—United States 1949-1951

Color, Sex and Marital Status	Age								
	<20	20–24	25–34	35–44	45–54	55–59	60–64	65–69	70–74
White Males									
Single	–	68	162	415	768	1,155	1,497	1,824	2,484
Widowed	0	368	487	608	874	931	1,120	1,243	1,440
Divorced	51	205	387	821	1,390	1,878	2,326	3,063	3,983
White Females									
Single	–	20	75	105	113	128	83	109	320
Widowed	334	192	166	180	218	228	309	377	548
Divorced	57	72	123	176	208	327	500	978	1,970
Nonwhite Males									
Single	–	137	448	1,148	1,896	2,892	2,937	3,590	4,594
Widowed	865	445	1,076	1,321	2,273	2,955	3,222	2,498	2,900
Divorced	506	137	602	877	1,571	2,183	2,647	3,184	3,763
Nonwhite Females									
Single	–	93	274	551	770	780	1,322	923	1,451
Widowed	402	285	449	596	1,047	1,554	1,853	1,035	1,079
Divorced	134	104	163	246	425	740	1,356	1,023	2,415

portant factors producing the discrepancies in recorded mortality rates exert a continuing or increased effect with increasing age.

Clearly, the two analyses are mutually contradictory at least in part. Particularly, the mortality ratios seem to call for an explanation for excess deaths that are greatest in the third and fourth decades of life and mainly for the widowed; while the absolute indexes call for an explanation of discrepancies that increase with age, as well as being greater among men than among women and among nonwhites than among whites.

The trends suggested by the absolute indexes are consistent with the selective factors discussed earlier and are in agreement with well known, though not completely understood, characteristics of contemporary mortality rates. Without disputing the fact that in general there is more than one valid way of comparing morbidity or mortality rates,[13-19] these observations suggest that in this situation the use of mortality ratios may have introduced some artificial problems.

Other Factors

The foregoing discussion is not intended to exclude completely the possibility that there is some "real" additional risk associated with widowhood or divorce. Ciocco[20] found a correlation in the length of life of husbands and wives, and further, that spouses had a significant tendency to die from the same cause when tuberculosis, influenza, pneumonia, heart disease, or cancer was the cause of death. This finding might be explained partly by infection and partly by such facts as marriages between patients in a tuberculosis sanatorium. Specific causes of death apparently have different effects according to marital status, and some plausible explanations have been proposed.[3-5]

The preceding analysis suggests, however, that existing population mortality data will not provide conclusive evidence of an important role for factors other than misclassification or selection. If such evidence exists it will probably have to be sought mainly in special studies, such as were proposed by Kraus and Lilienfeld.

Summary and Conclusions

The 1950 United States census data and the 1949-1951 mortality data were reviewed in an effort to characterize and analyze the differences in mortality rates observed among married, single, widowed, and divorced persons. Rather than measure an "increased risk of death" by the use of mortality ratios, an index related to the "population at risk" was suggested as an alternative. When this index was applied to the recorded rates, the excess mortality among nonmarried persons observed in all categories was greater for males and for the nonwhite groups, and increased with age. There was no consistency in the marital class that was most affected in different age groups.

A number of possible explanations of these observations were discussed. There is strong evidence of unequal errors in census figures and of possible misclassification in death certificates which may be responsible in part for the observations. One cannot eliminate the further possibility that a large part of the excess mortality reported is a fortuitous effect of the fact that healthy persons are more likely to marry or to remarry than are sick persons. The possible role of other factors cannot be conclusively demonstrated from population mortality data of this type.

It is emphasized that mortality ratios do not necessarily go up or down in a simple, regular fashion, but are influenced by many factors. Therefore, it may be fallacious to base conclusions on trends in these ratios.

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APPENDIX

Estimate of Effect of Classification Errors on Mortality Ratios

Within a specific age-sex-race group, let:

m and w be the actual numbers of married and widowed persons;

m_d and w_d be the actual numbers of deaths in each category;

a be the proportion of deaths among married persons that are incorrectly classified as "widowed";

b be the proportion of widowed persons incorrectly called "married" in the census.

I. Assume that the true mortality rates are equal; i.e.:

$$\frac{m_d}{m} = \frac{w_d}{w} = q$$

Then the recorded married death rate is:

$$\frac{m_d(1-a)}{m+bw} = \frac{qm(1-a)}{m+bw} = \frac{q(1-a)}{1+bw/m}$$

The recorded widowed death rate is:

$$\frac{w_d+am_d}{w(1-b)} = \frac{q(w+am)}{w(1-b)} = \frac{q(1+am/w)}{1-b}$$

The recorded mortality ratio is:

$$\frac{(1+am/w)}{(1-b)} \frac{(1+bw/m)}{(1-a)}$$

If the true mortality rates are equal, the recorded mortality ratio depends on the ratio w/m as well as on a and on b.

II. If the true mortality rates are not equal, but their ratio is constant, so that

$$\frac{m_d}{m} = q \text{ and } \frac{w_d}{w} = Kq,$$

the recorded mortality ratio in the above model is, by a similar process:

$$\frac{(K+am/w)}{(1-b)} \frac{(1+bw/m)}{(1-a)}$$

Dr. Sheps was formerly assistant professor of preventive medicine, Harvard University Medical School, Boston, Mass., and is now associate research professor of biostatistics, Department of Biostatistics, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pa.

For the most part the recent literature on staphylococcal disease has centered on general and maternity hospitals. The report presented here deals with an outbreak in a mental hospital, in which the inanimate environment was not incriminated. Staff personnel and patients provided the sources of infection.

AN EPIDEMIC OF STAPHYLOCOCCAL INFECTIONS IN A MENTAL HOSPITAL

Sanford M. Farrer, M.D.; Elizabeth Zacha, R.N.; Terrell O. Carver, M.D., F.A.P.H.A.; W. W. Benson, M.P.H.; and Louise Barney, B.S.

DURING recent years the medical literature has contained many accounts of staphylococcal epidemics which emphasize the ubiquitous problem of staphylococcal infections in hospitals. Up to the present time, however, attention to this problem has been centered in general and maternity hospitals. The purpose of the present paper is to record the results of an epidemiologic investigation of staphylococcal infections in a mental hospital during February, 1959, and to describe certain of the factors related to their prevention and control.

The Hospital

The hospital is located in southeastern Idaho. It was established in 1886, but with the exception of one building constructed in 1901, all of the patient areas were built between 1938 and 1952. The hospital is situated in a town of 8,000 persons, but it may be considered a self-contained economic community with an extensive farm, bakery, cannery, pasteurization plant, kitchen, laundry, carpentry shop, and recreation hall. The meat, produce, and dairy products used at the institution are all grown and processed on the hospital farm. The hospital consists of six buildings which house mentally-ill patients and several other buildings which are used for food service, laundry, administration, farm equipment, and personnel residences. The patient areas are identified by letter, buildings B, C, D, F, G, and Y.

The patient census at the time of this investigation was 658. About 70 per cent of them were long-term residents suffering from chronic mental disorders such as organic brain syndromes and schizophrenia; 30 per cent were transient patients with acute brain syndromes, personality disorders, psychoneuroses, and a miscellany of diseases. The average length of stay for the transient group was 50 days.

Most of the patients were residents of the state of Idaho. Their age distribution was as follows: 33 per cent of them were less than 45 years of age (most of the transient population was in this age group); 43 per cent were between 45 and 64 years of age; and 24 per cent were above 65. Almost all of the patients were white. Fifty-four per cent were males, 46 per cent were females.

The hospital employs approximately 265 personnel, most of whom reside on the grounds of the institution or nearby.

The composition of the employee population was as follows: 150 ward attendants and nursing personnel; seven physicians of whom six were psychiatrists; two psychologists; three occupational therapists; two laboratory technicians; three social workers; and 99 persons engaged in various other capacities such as maintenance, transportation, kitchen, laundry, agriculture, and clerical duties. Of the 150 nursing personnel, 11 were registered nurses and 15 were licensed practical nurses. Most of the nursing attendants were medically untrained psychiatric aides. The age distribution of personnel ranged from 19 to 64 years with the greater number of employees in the fourth and fifth decades.

Description of the Epidemic

The medical staff of the hospital was unaware of any serious problem of staphylococcal infections until late December, 1958. Several of the physicians had observed patients with furuncles on various occasions, but an unusual incidence of infections had not been recognized until the present episode.

On December 25, 1958, a patient died with cellulitis of the foot and a clinical illness suggesting the presence of bacteriemia. During the following seven days five patients were found to have suppurative cutaneous infections. Cultures from these lesions were forwarded to the laboratories of the Idaho Department of Health where the microorganisms were identified as Staphylococcus aureus, coagulase-positive, bacteriophage pattern 52A/79. As a result of this finding, investigators from the State Health Department visited the institution and discovered 15 additional patients with suppurative lesions of the skin and one patient with severe bronchopneumonia. Cultures of these patients also yielded coagulase-positive Staphylococcus aureus.

In early February, 1959, a joint investigation was made by the Idaho Department of Health and the Communicable Disease Center, U. S. Public Health Service, in order to determine the source, nature, and extent of the staphylococcal problem in the hospital and to recommend control measures.

Methods

Case Finding

In order to measure the nature and extent of staphylococcal morbidity, hospital charts, laboratory records, and mortality certificates were reviewed. Physical examination was carried out on some 600 patients and 250 employees for evidence of suppurative infection. Employees were interviewed for a history of infection and, in addition, a questionnaire was distributed to 266 employees to determine the extent of staphylococcal infection among them.

Bacteriology

In all cases where staphylococcal disease was suspected, a culture from the lesion was obtained. Cultures were collected from the anterior nares of most of the personnel. The environment was also sampled. All cultures were taken with sterile cotton swabs, plated on blood agar, and then incubated for 24 hours at 37° C. Staphylococci isolated from blood agar plates were tested for coagulase production by standard tube methods,[1] and were typed by means of 19 bacteriophages obtained from the Communicable Disease Center, Chamblee, Ga., by the methods of Blair and Carr,[2] and Williams and Rippon.[3] Antibiotic sensitivity tests were performed by the disc method utilizing medium concentration discs obtained from Difco.

Review of Medical and Nursing Practices

Medical and nursing practices, policies, and procedures relative to staphylococcal diseases were reviewed as well as the aseptic technics employed in

Table 1—Staphylococcal Illness Among Patients and Personnel

Type of Lesion	Patients	Personnel	Total No.	Total %
Furuncle	19	1	20	26.3
Pustule	19	9	28	36.8
Impetiginous	14	1	15	19.7
Cellulitis	7	1	8	10.5
Folliculitis	1	0	1	1.3
Infected superficial ulcer	2	1	3	3.9
Broncho-pneumonia	1	0	1	1.3
Total	63	13	76	

patient care. In addition, a survey was made of practices relating to laundry, food service, and housekeeping.

Results

Incidence of Infection

Medical and laboratory records relative to pyogenic infection were incomplete. The only effective method for discovering the nature and extent of staphylococcal infection was physical examination of patients and employees by physicians. As a result of this case-finding method, a total of 63 infections was identified in patients and 13 in personnel. The types of lesions are listed in Table 1. The most common manifestation of staphylococcal disease was the pustule, which accounted for 36.8 per cent of the infections. Twenty of the lesions, 26.3 per cent, were furuncles, and 15, 19.7 per cent, were impetiginous. The remaining skin lesions included cellulitis, folliculitis, and infected decubitus ulcers. One case of staphylococcal bronchopneumonia was identified. The lesions in patients were located, for the most part, on unexposed surfaces of the body, the back, groin, buttocks, axillae, and thighs. Many of those affected had chronic skin disorders such as neurodermatitis, psoriasis, seborrheic inflammation, and disorders whose etiology appeared to be fungal. Moreover, most of the patients with staphylococcal infection had multiple areas of nonspecific erythema and excoriation. It was not uncommon to find scars, presumably resulting from healed staphylococcal lesions, on the skin of patients with infections.

The attack rate among the patients was 9.6 per 100; among the hospital personnel, 4.9 per 100. All of the cases were among whites. Sex and age distributions of infected patients are listed in Tables 2 and 3. Almost three times as many cases occurred among males as females. The attack rate among males was 13.2 per cent; among females, 5.3 per cent. Cases occurred in all age groups. Attack rates ranged from 6.1 per cent in the 65- to 74-year-age group to 17.5 per cent in the group under 24 years of age. In view of the findings often reported from general hospitals, namely that staphylococcal infection is more common in patients in the older and debilitated age groups, it was surprising to discover the high attack rates in the younger groups, under 24 years and from 25 to 34 years, as well as in patients more than 75 years old.

Of the 266 personnel morbidity questionnaires distributed, 256, or 96.6 per cent, were returned with completed

Table 2—Sex Distribution of Lesions Among Patients

Sex	Population	Number of Cases	Attack Rate (Per cent)
Male	356	47	13.2
Female	302	16	5.3
Total	658	63	9.6

answers. This survey and physical examination of employees revealed that 13 employees were suffering from overt staphylococcal infection. As in the patient population, the most common manifestation of disease was pustular. Employees affected included one physician, one social worker, one psychologist, one cook, and nine members of the nursing service. Five of these persons, including two nurses who were responsible for nursing education, did not work in a single hospital area; the nature of their work made it necessary for them to go from area to area.

The ages of the infected employees ranged from 22 to 59 years. Seven of the lesions occurred among female personnel, an attack rate of 2.6 per cent, and six of the lesions were among males, an attack rate of 2.3 per cent. All of the infected personnel were white.

Most of the skin lesions in both patients and personnel were minor infections in the sense that they were small in surface area and produced little systemic reaction or disability. A number of cases occurred, however, which were more severe and caused considerable morbidity. This was particularly true of patients with cellulitis, of whom one died, and several others had signs and symptoms of systemic toxicity. The patient with staphylococcal bronchopneumonia was severely ill and had evidence of pulmonary insufficiency.

Table 3—Age-Specific Attack Rates of Lesions in Patients

Age Group Years	Population	Number of Cases	Attack Rates (Per cent)
Under 24	40	7	17.5
25-34	61	7	11.5
35-44	115	10	8.7
45-54	141	13	9.2
55-64	142	12	8.5
65-74	98	6	6.1
75 and over	61	8	13.1
Total	658	63	9.6

It was not possible to construct an accurate epidemic curve of staphylococcal infection because there was a paucity of laboratory and clinical records prior to the present investigation, and because of the nature of the patients it was not possible to obtain accurate individual histories. A case of cellulitis and possible bacteriemia of unknown etiology was recorded on December 25, 1958, followed by the discovery of 20 cases of staphylococcal infection during the ensuing three weeks in January, 1959. Most of the additional cases were identified during the last week in January and the first two weeks in February. Since only a few cases occurred during the remainder of February, the peak of the outbreak occurred between January 23 and February 7, 1959.

Etiology

The primary clinical criterion for diagnosis of staphylococcal infection was the presence of purulent discharge. Other physical signs of inflammation were observed, but because dermatological disorders of various kinds existed in the population the criterion of purulent exudation was used for inclusion of cases in this series. Based on this criterion, 75 cutaneous infections and one case of bronchopneumonia caused by Staphylococcus aureus were identified among patients and personnel.

The principal laboratory procedures used to characterize these cocci were coagulase production, yellow pigment production, hemolysis, and sensitivity to several antibiotics. The results of testing 20 cultures from patients' lesions to 12 antimicrobials were as follows. All of the strains were sensitive to chloramphenicol, erythromycin, novobiocin, kanamycin, oleandromycin, tri-acetyl oleandromycin, neomycin, and furacin. All

strains were sulfonamide-resistant. Ten per cent were sensitive to penicillin, 45 per cent to streptomycin, and 35 per cent to tetracycline. There was no correspondence of sensitivity and phage pattern.

Seventy-six cultures from staphylococcal infections were bacteriophage-typed. The largest number, 29, or 38.2 per cent, were nontypable with the phages employed at the routine critical test dilution. Among the typable strains, 24, or 31.6 per cent, were Type 52A/79, a strain classified in Group I by Blair. Five strains, or 6.6 per cent, were Type 7; 4 strains, or 5.3 per cent, were 7/47/54. The remainder were distributed among miscellaneous types mainly of phage Group III. Only one strain of Type 80/81, the international "hospital" or "epidemic" strain, was discovered. The various phage types were indiscriminately distributed among the different skin disorders with the exception that almost all of the impetiginous lesions were associated with nontypable strains.

Epidemiology

Area Distribution of Infections

The ward to which a patient is assigned is determined by sex and psychiatric condition rather than age. Patients reside in "closed," "open," or "locked" areas depending upon their ability to cope with the various tasks of daily living. Patients in open wards are permitted general freedom of the grounds, and many of them are employed in various capacities such as working on the farm, in the laundry, kitchen, and cannery. Patients on closed wards generally do not leave the ward except at dining hours when they go to common mess halls. Patients on certain closed wards in the C and D buildings, as well as patients on locked wards, do not leave them. The C building contains the medical-surgical ward, C2, as well as wards C3 and C4 for bedfast, semi-invalid patients who require extensive help and supervision. Most of the patients in the C building are more than 50 years of age. Buildings F and G contain patients with chronic psychiatric disorders, many of whom have organic brain syndromes. Building B houses alcoholics, senile patients, and a number of juveniles. Building D is composed of two small wards which house patients with tuberculosis. Building Y is reserved for most of the patients who receive active psychiatric treatment and for "maximum security" cases. Most of the patients in building Y are below 40 years of age.

Cases of staphylococcal infection are listed by area in Table 4. Infections in patients were identified in five of the six buildings and in 12 of the 17 wards. Forty-seven, or 74.6 per cent of the infections occurred in the C and F buildings. Analysis of attack rates revealed that C2 was the area most involved with a rate of 34.1 per cent. Other areas that experienced a high incidence of infection were F4, YB1, and F2-3. The initial cases that developed in late December and early January occurred on ward C2, and it was evident that a concentration of infection existed in the C building and in the F building. With the exception of F2-3, which is an open ward, the C-building wards and F4 are similar in that they are closed areas which house most of the chronic, debilitated, semi-invalid cases of the hospital. The patients of these two areas have no contact except through common attending personnel.

The greater number of Type 52A/79 infections came from the C and F buildings, particularly from C2. About half of the strains from F, and almost all of those from Y were nontypable.

Source and Transmission of Infection

A number of nursing service personnel were not assigned to a single area, but because of personnel shortages, they

were shifted frequently between buildings and wards. In order to arrange for days off duty, there was a constant rotation of personnel through the various patient areas. Because it was discovered that a concentration of infection existed in C and F buildings, 15 male attendants who worked on both of these wards were interviewed. Two of them volunteered a history of furunculosis during the past two months, one of whom had extensive acne with pustular lesions. Cultures secured from two of these attendants revealed in one instance Type 52A/79 from a draining furuncle, and in the other a nontypable strain from a pustule.

Table 4—Distribution of Infections by Ward

Ward	Population	Number of Cases	Attack Rate (Per cent)
C2	41	14	34.1
C3	55	3	5.5
C4	55	6	10.9
C Building	151	23	15.2
F2-3	96	15	15.6
F4	49	9	18.4
F Building	145	24	16.6
G2	108	1	0.9
G4	51	1	0.0
G Building	159	2	1.3
YA1	26	2	7.7
YB1	23	4	17.4
YC1	11	0	0.0
YA2	21	0	0.0
YB2	30	4	13.3
YC2	23	0	0.0
Y Building	134	10	7.5
B2	9	1	0.0
B3	53	3	5.7
B Building	62	4	6.5
D1	6	0	0.0
D2	1	0	0.0
D Building	7	0	0.0
Total	658	63	9.6

Nasal cultures were obtained from the anterior nares of nursing personnel, physicians, social workers, psychologists, and laboratory workers. Forty-six employees, or 27.5 per cent of 167 cultured, carried coagulase-positive staphylococci in the nares. Most of the strains were either nontypable or unlike those causing lesions in patients, but 11 persons, or 6.6 per cent, were carriers of Type 52A/79, the strain isolated from 31.6 per cent of the lesions. These 11 persons were employed in the nursing service; seven of them rotated through C and F wards and two were nursing supervisors who rotated through the whole hospital. Moreover, both of these supervisors had pustules due to Type 52A/79. Type 52A/79 was also cultured from intact skin on the hands of one of the C-F attendants.

A common source, such as the laundry, appeared unlikely because of the concentration of cases in two buildings. However, laundry and kitchen personnel were examined for lesions, and cultures were obtained in the laundry during each step of the sorting, washing, drying, ironing, and distributing procedures. These cultures were negative and indicated that the laundry was not distributing contaminated linen to the hospital. No lesions were discovered among employees in the laundry or kitchen. A local veterinarian examined the farm animals for evidence of pyogenic disease with negative results. No relationship was found between open-ward patients with staphylococcal infections and their work assignments. There was no correlation between patients with infections and the drugs used in the treatment of psychiatric illnesses.

One hundred and thirteen cultures were obtained from the environment of the wards in the C and F buildings, the laundry, and the occupational therapy room. These cultures were taken from tables, door knobs, floors, walls, toilet seats, bed linen, chairs, washbowls, air

vents, tools, soap solutions, clothing of personnel, and laundry bags. Only 14 cultures yielded coagulase-positive staphylococci, most of which were unlike the strains causing staphylococcal infections. The single 52A/79 isolate came from the floor of ward C2.

Environmental Hygiene and Aseptic Technics

Procedures employed in the care of the patients and the environment were reviewed. Most of the wards were satisfactorily cleaned and personnel were aware of the importance of sanitation. However, several practices considered to be potential means for spreading infection were observed. All wards were crowded. In several wards the beds were less than 30 inches apart. Facilities for the storage of patients' clothing and linen were limited with the result that these items were often placed under mattresses or on top of the beds.

Housekeeping procedures were haphazard. Sheets were changed once per week for ambulatory patients. Dry mopping and dusting were practiced, and germicidal solutions for surface cleansing were used only occasionally. Handwashing facilities were inadequate throughout the institution. Most sinks were inconveniently located and were operated by hand faucets. Soap and towels were not generally available. The nursing attendants who cared for the patients performed all the housekeeping duties. Men who sorted the dirty and contaminated laundry also folded clean sheets. No handwashing occurred between these two tasks. Carts and trucks for transportation of contaminated and clean linen were interchangeable. It is perhaps surprising that despite these practices, the linen was not contaminated.

Isolation facilities for infectious diseases were inadequate both from the standpoint of space and equipment. Patients with staphylococcal infections were isolated in wards used by tuberculosis patients, but were not segregated from one another. Separate nursing units were not used for isolation cases. Personnel were inadequately educated in the principles and practices of aseptic technic.

On these wards handwashing and toilet facilities were inadequate, as was the supply of masks, gowns, and gloves. The unit was not supervised by a registered nurse. Numerous violations of aseptic technic were noted. Attendants often wore the same gown in going from patient to patient; handwashing between patients was the exception rather than the rule. Nurses who worked in the D building, the infectious disease isolation unit, also worked in the C building, which housed the most debilitated cases in the hospital. Masking procedures were haphazard. Accepted technics for handling contaminated linen were not observed.

Treatment of Staphylococcal Infections

Antibiotics administered systemically were used to treat minor cutaneous lesions. Incision and drainage of lesions was not practiced and most of them were not covered by sterile dressings. Eighty per cent of the patients with infections were not isolated and remained on the general wards. Almost all of the personnel with overt lesions continued to work.

Discussion

It might be expected that mental hospitals, because of the characteristics which are peculiar to them, would be fertile ground for outbreaks of staphylococcal infection. Patients in mental hospitals, as opposed to those in general hospitals, usually remain for long periods of time, and the population consists predominantly of persons in the older age groups. Many of the patients are debilitated by chronic organic diseases, such as diabetes mellitus, cardiovascular

disorders, tuberculosis, malignant neoplasms, and pulmonary disorders. Malnutrition is not uncommon. Moreover, because of their psychiatric diseases, patients are often unable to maintain satisfactory standards of body cleanliness and hygiene. Many of them are incontinent, bedfast for long intervals, and semi-invalid.

Superimposed on this combination of factors are the numerous administrative problems that plague mental hospitals. Many patients live in crowded quarters. Psychiatric nurses and attendants are generally overburdened with responsibilities, and there are severe shortages of personnel. Not infrequently, mental hospital budgets are so tight that additional personnel, even if they could be found, cannot be employed. This combination of circumstances (a highly susceptible patient population and a crowded environment) might be expected to engender epidemics of staphylococcal infections in mental hospitals.

The circumstances in the hospital under discussion conform to the pattern outlined above. About 70 per cent of the patients were chronic residents, and many of them were debilitated. Most of the staphylococcal infections were found among the chronic debilitated groups in the C and F buildings with its bedfast patients, principally those with arteriosclerotic heart disease, congestive heart failure, hypertensive heart disease, bronchiectasis, and chronic nephritis. Examination of the male patients in the F building revealed a lack of body cleanliness.

Administrative and environmental shortcomings were in evidence. These included the lack of proper isolation facilities, the assignment of housekeeping chores to the nursing service personnel, the lack of uniform housekeeping procedures which minimize the spread of infection, lack of adequate handwashing facilities, poor standards of aseptic technic applied to patients with infection, and, perhaps more than any other factor, the constant traffic of personnel from one patient area to another. Thus, in the face of a highly susceptible population, ideal environmental circumstances were present for the transmission of staphylococci and the perpetuation of an outbreak of infections.

A variety of strains were found to cause staphylococcal infections at this hospital. The greatest number, unfortunately, were nontypable according to existing standard methods of bacteriophage typing. Among the typable strains, 52A/79 was the most common organism identified. Study at other institutions has indicated that this organism is not uncommonly encountered in the nares of patients on admission who have not had previous experience with hospitals, and thus suggests that Type 52A/79 may be a "community" strain of staphylococcus as opposed to Type 80/81, a "hospital" strain recovered from numerous nursery epidemics.[4] It should be noted, however, that Penikett and his associates have reported a small outbreak of postoperative wound infections due to Type 52A/79 which was traced to operating room carriers.[5] The strains isolated at the mental hospital were highly sensitive to eight antimicrobials, and fairly sensitive to another two. Penicillin was the only antibiotic to which there was a general lack of sensitivity.

Several avenues existed for the spread of staphylococci. Perhaps most important was direct contact between persons. Most of the patients who developed overt, draining lesions were not isolated and were free to infect fellow patients and personnel. This contact was enhanced by the close mingling of patients in closed and semiclosed wards where the number of infections that occurred was high. Furthermore, 13 employees were identified with infection, among whom two were nursing supervisors who circulated throughout the entire hospital with lesions caused by Type 52A/79.

Among the employees that shifted between C and F (where the incidence of infections caused by 52A/79 was greatest) were three attendants with histories of suppurative infection, one with a draining furuncle due to Type 52A/79. Three of the other employees with infection, a physician, a social worker, and a psychologist, had positions which required that they circulate through the hospital from ward to ward. It is apparent, therefore, that there were multiple opportunities for spread of infection from patient to patient as well as between patients and attending personnel.

In addition to persons with frank lesions, 27.5 per cent of the personnel who maintained contact with patients were nasal carriers of coagulase-positive staphylococci. The incidence is not unusual in hospitals or in the general population for that matter. However, 11 nasal carriers of Type 52A/79 were identified and nine of these maintained contact with C and F wards. Two of these nine carriers had frank lesions due to the same strain.

Little evidence was found that incriminated environmental contamination as a source of staphylococcal infection. No common sources, such as the laundry, the farm animals, or the kitchen, were identified.

Several control measures were recommended for adoption. Enough time has not elapsed to determine their effectiveness. The main points of this program were: surveillance of staphylococcal infections, communications within the hospital regarding infections, establishment of facilities for the proper care of patients with infectious diseases, environmental hygiene, control of personnel carriers, and the establishment of facilities for bacteriological diagnosis of disease. It was emphasized that hospital personnel with frank staphylococcal infection should be excluded from duty until the infection is healed. It was also recommended that arrangements be made for the treatment of employees with staphylococcal infections. An educational program pointing out, among other things, the dangers of staphylococcal infection and the proper use of aseptic nursing technics was recommended. Furthermore, it was suggested that housekeeping and laundry practices be reviewed to evaluate the effect of existing procedures on the dissemination of staphylococci.

Summary

An outbreak of staphylococcal infections in a mental hospital is described. Sixty-three infections in patients and 13 infections in personnel were identified over a two-month period. Seventy-five cases were skin lesions, principally pustular. There was one case of bronchopneumonia.

The attack rate among patients was 9.6 per cent; among personnel, 4.9 per cent. Almost three times as many infections occurred among male patients as females.

Staphylococci from lesions were bacteriophage-typed. Thirty-eight per cent of the strains were nontypable at the routine critical test dilution. Among the typable strains, Type 52A/79 was the most common.

Epidemiological investigation revealed that two areas of the hospital were principally involved in the outbreak. Three nursing service personnel who worked in both these areas were found to have frank staphylococcal lesions caused by Type 52A/79, and nine other persons who worked in these areas were nasal carriers of Type 52A/79. In addition to the likelihood of spread from infected personnel to patients, there was ample opportunity for spread between patients since aseptic technics were inadequate and most of the patients with staphylococcal infections were not isolated.

No evidence was found which incrimi-

nated the inanimate environment as the source of the infections.

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Dr. Farrer, formerly epidemic intelligence service officer, CDC, assigned to the Department of Research Medicine, University of Pennsylvania, Philadelphia, is now with the Department of Pathology, Peter Bent Brigham Hospital, Boston, Mass. Miss Zacha is epidemic intelligence service nurse officer, Communicable Disease Center, assigned to the North Carolina State Board of Health, Raleigh, N. C. Mr. Carver, Mr. Benson, and Miss Barney are, respectively, administrator of health, state registrar and assistant chief of preventive medicine, and microbiologist; all of the Idaho Department of Health, Boise, Idaho.

This is a report from the Idaho Department of Health, Boise, Idaho, and the Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Atlanta, Ga.

Course on APHA Housing Appraisal Methods

Southern Illinois University and the Illinois Department of Public Health, with the assistance of the Public Health Service, are sponsors of a course in the APHA Housing Quality Appraisal Technique starting May 22. The five-week course ends with a seminar on Urban Public Health and the Residential Environment to be held June 19-23. Students completing the course will be certified as qualified in the APHA Technique, and the copyrighted APHA forms will be released to them for use in their programs.

Subject matter in the Appraisal Technique portion of the course includes sampling and field inspection procedures, office processing of field data, coding and punching for permanent card records, appraisal of neighborhood environment, and the analysis of data.

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Further details from Director, Department of Community Development, Southern Illinois University, Broadview Hotel, East St. Louis, Ill.

The authors of this paper report a series of investigations of subtypes of certain strains of staphylococci. They point out as well the epidemiologic application of these findings to hospital problems.

LABORATORY OBSERVATIONS ON THE LYSOGENIC PROPERTIES OF HOSPITAL STAPHYLOCOCCI AND THEIR POSSIBLE EPIDEMIOLOGICAL IMPLICATIONS

Nobuo Sakurai, M.D., Dr.Med.Sc.; Elaine L. Updyke, Sc.D., F.A.P.H.A.; Andre J. Nahmias, M.D., M.P.H.; and Mary R. Gerhardt, Ph.D.

IN RECENT YEARS intensive laboratory investigations have been undertaken by several investigators to determine the biologic and epidemiologic relationships of staphylococcus strains showing similar but not identical phage typing patterns.[1-3] Such studies have been stimulated by the world-wide occurrence of hospital-acquired staphylococcal infections, particularly those caused by phage types 80/81, 52/52A/80/81 and 52/52A/80. When these strains were first seen in the United States 80/81 was predominant.[4,5] However we, as well as others, have observed a gradual, but steady increase in the appearance of 52/52A/80/81 and 52/52A/80 strains in association with hospital staphylococcal infections.[6] Furthermore, in studies of surgical problems in Atlanta, strains of two of the phage types were isolated from a single culture from one surgeon,[7] and from cultures taken at the same time from different sites of other individuals, both personnel and patients.[6]

It has been known for some time that the phage type of a staphylococcus strain may be changed by lysogenization; i.e., by the introduction of a new phage into the strain by in vitro exposure of the strain to a phage, or presumably by contact with lysogenic (phage carrying) staphylococci in nature.[8-10] It seemed likely that this phenomenon could be responsible for the existence of the three strains 80/81, 52/52A/80/81, and 52/52A/80. Accordingly investigations were undertaken to study the relationships of the lysogenic and lysogenizing properties of these strains. It was found that distinct subtypes existed within each of the three original types, that conversion from one type to another could be induced by lysogenization, and that phages isolated from the strains could be used to clarify epidemiologic relationships of personnel to postoperative staphylococcal infections in an Atlanta hospital.[6]

During the course of this study, in vitro conversions of the 80/81 and 52/52A/80/81 strains to 52/52A/80/81 and 52/52A/80 strains, respectively, were reported independently by others.[1,2] Our results supply further independent confirmation of such conver-

sions and demonstrate the reverse conversion from 52/52A/80/81 to 80/81.

Materials and Methods

Cultures—The strains used in this study were selected from specimens received for phage typing from various state laboratories and hospitals. Most of the cultures had been stored by the sand desiccation method.[11] Since routine clinical specimens are sometimes mixed cultures of staphylococci,[1,12] the strains were streaked from a single colony for three consecutive subcultures prior to use in the experiment. In addition, to determine whether such transferring assured homogeneous cultures, 100 separate colonies of each of four strains (80/81 strain DA 226-6, 80/81 strain DA 594-8, 52/52A/80/81 strain DA 100-9, and 52/52A/80 strain DA 223-8) were picked and typed with the phages in routine use in this laboratory. Each of the four strains showed complete homogeneity with respect to their phage pattern.

Phages—Routine typing was done with the 21 phages of the international basic set and three additional phages as follows: 29, 52, 52A, 79, 80, 3A, 3B, 3C, 55, 71, 6, 7, 42E, 47, 53, 54, 73, 75, 77, 42D, 187, 83(VA4), 44A, 81. The typing technic was that described by Williams, et al,[13] with minor modifications.[14] Other phages used for typing and/or lysogenization were isolated in this laboratory from hospital strains of 52/52A/80/81, 52/52A/80, 80/81, and 80. The detection and isolation of phages from lysogenic staphylococci was accomplished by overlaying one on the other on agar medium according to the method of Fisk.[15] To distinguish the phages isolated in this study from the standard phages the letter S was prefixed to the phage number. All phages were filtered through a porcelain filter and tested for sterility before use.

Media—Trypticase Soy Broth* and Trypticase Soy Agar* were used throughout the study.

Lysogenization — This was accomplished by placing a drop of concentrated phage—usually 100 x the routine test dilution (RTD)—on an agar plate seeded with a four-hour broth culture of the staphylococcus strain to be lysogenized. The plate was incubated at 37° C for four hours and left at room temperature overnight. Secondary growth, if present, usually arose within 12 hours and in some cases was evident immediately after the four-hour incubation. Cells from the secondary growth within a lysed area were picked and seeded to a fresh agar plate. After overnight incubation at 37° C single colonies from the latter plate were picked and subcultured. All cells of the secondary growth were not always lysogenized but mixed lysogenic and nonlysogenic colonies could be recognized by their transparent, glassy, degenerated appearance on first subculture or the presence of lytic plaques on the second subculture. Such mixed cultures were not used in any tests. The proportion of lysogenic response was not estimated. The lysogenicity of lysogenized cultures was tested by Fisk's method[15] of placing each one on its parent strain and on the indicator strain for the lysogenizing phage, and by demonstrating its resistance to the lysogenizing phage. The conversion of phage type after lysogenization was tested with the standard phages. Lysogenized strains were designated by placing the number of the lysogenizing, and therefore now carried, phage in parentheses after the original strain number; for example, DA 226-6 (S-36) designates a culture of strain DA 226-6 lysogenized with phage S-36.

Definitions—Prophage: A phage precursor carried by a cell without lysing that cell. Lysogenic: carrying a pro-

* Baltimore Biological Laboratories.

Table 1—Lysogenizations with Phages from Staphylococcus Strains with Phage Pattern 52/52A/80

Source of Lysogenizing Phage		Lysogenizing Phage	Susceptible to Lysogenizing Phage		Induced by Lysogenization	
Type	Subtype		Type	Subtype	Type	Subtype
52/52A/80 (DA 779-8)*	I	S-39	52/52A/80	II & III	52/52A/80	I
			52/52A/80/81	II & IV		
			80/81	I & III		
			80/81	II	under study	
52/52A/80 (DA 16-9a)	II	S-85a	52/52A/80	I & III	52/52A/80	II
			52/52A/80/81	I & IV		
			80/81	I & III		
			80/81	II	under study	
52/52A/80 (DA 412-8)	III	S-41	52/52A/80	I & II	52/52A/80	III
			52/52A/80/81	I, II, & IV		
			80/81	I & III		
			80/81	II	29/52/52A/80/(79)†	

* For details on strains and phages see text and appendixes.
† Weak reaction with 79; variable with 29.

phage. Lysogenic to: yielding a phage which can lyse and lysogenize. Lysogenize: introduce a phage into. Lysogenization: introduction of a phage into.

Results

On the basis of their lysogenic properties each of the three phage types under study was divided into three or more subtypes which we designate by Roman numerals. Within each type and between the types lysogenizations were accomplished, often reciprocally and usually with conversion to a strain having the characteristics of the parent strain of the lysogenizing phage. For example: strains 52/52A/80 II lysogenized by the phage of strains 52/52A/80/81 I are converted to 52/52A/80/81 I, and strains 52/52A/80/81 I lysogenized by the phage of strains 52/52A/80 II are converted to 52/52A/80 II. Details of our observations are as follows*:

1. 52/52A/80 Subtypes—Three have been identified.

(a) Subtype I (S-39 type). Table 1—Strains of this subtype are characterized by their identity to strain DA 779-8 from which phage S-39 was originally isolated. S-39 can lyse and lysogenize 52/52A/80 II and III, and 52/52A/80/81 II, the phages from all of which can in turn lyse and lysogenize the 52/52A/80 I strains. Phages from subtype I strains can also lyse and lysogenize 80/81 I, II, and III, and 52/52A/80/81 IV strains but the reciprocal relationship

* To simplify the textual and tabular presentations of general concepts, most of the specific information on cultures, phages and conversions is given in Appendixes 1 and 2.

has not been observed. In every case except 80/81 II the lysogenized cultures are converted to the parent strain of the lysogenizing phage. Reactions with 80/81 II are of particular interest and will be discussed in more detail later. In our collection of cultures we have found many strains of this subtype, most of which were received in July, 1956, from the California State Health Department Laboratory.

Further studies on the interrelationships of lysogenic properties of the three major types under study indicate that there are two additional subdivisions within this subtype. Details will be reported at a later date.

(b) Subtype II (S-85a type). Table 1—Only the original strain of this subtype has been found; i.e., DA 16-9a from which phage S-85a was isolated. This strain is lysogenic to 52/52A/80 I and III, and 52/52A/80/81 I which are in turn lysogenic to it. It is also lysogenic to 52/52A/80/81 IV and 80/81 I, II, and III but the reciprocal relationship has not been observed. Conversion is to the parent strains except with 80/81 II.

(c) Subtype III (S-41 type). Table 1—These strains are characterized by their identity to DA 412-8 from which phage S-41 was isolated. They are reciprocally lysogenic to 52/52A/80 I and II, and 52/52A/80/81 I and II. They are also lysogenic to 52/52A/80/81 IV and 80/81 I, II, and III but the reciprocal relationship has not been observed. Conversion is to the parent strain except with 80/81 II. Many strains of this subtype have been recovered in 1959 from sporadic infections in an Atlanta hospital.

2. 52/52A/80/81 Subtypes — Three have been identified.

(a) Subtype I (S-36 type). Table 2—This subtype is considered to correspond to subtype I of 52/52A/80 because of similarities in the lytic spectra of phages S-36 and S-39 and also because of more basic interrelationships of both phages and organisms, interrelationships which will be reported elsewhere. These strains are characterized by their identity to DA 16-7 from which phage S-36 was isolated. These 52/52A/80/81 strains are reciprocally lysogenic to 52/52A/80 II and III, and 52/52A/80/81 II. They are also lysogenic to 52/52A/80/81 IV and 80/81 I, II, and III but the reciprocal relationship has not been observed. Conversion is to the parent strain except with 80/81 II. We have found many strains of this subtype from babies and personnel involved in an outbreak in a nursery in South Carolina in January, 1957.

(b) Subtype II (S-85b type). Table 2—This subtype corresponds to subtype II of 52/52A/80. The strains are characterized by their identity to DA 16-9b from which S-85b was isolated. They are reciprocally lysogenic to 52/52A/80 I and III, and 52/52A/80/81 I. They are also lysogenic to 52/52A/80/81 IV and 80/81 I, II, and III but the reciprocal relationship has not been observed. Conversion is to the parent strain except with 80/81 II. Several strains were found in 1958 and 1959 from sporadic infections in an Atlanta hospital both during and following the 1958 outbreak of postsurgical infections mentioned above.

(c) Subtype III—As yet we have found no strains which correspond to subtype III of 52/52A/80.

(d) Subtype IV (O-type). Table 2—As yet we have found no strains of 52/52A/80 which correspond to this subtype. The strains are designated O-type since no phage has been isolated from them. They are characterized by their identity to DA 736-8 which can be lysed and lysogenized by all subtypes of 52/52A/80 and by 52/52A/80/81 I and II, in each case with conversion to the parent strain of the lysogenizing phage. Several strains were found in 1958 and 1959 from carriers and in-

Table 2—Lysogenizations with Phages from Staphylococcus Strains with Phage Pattern 52/52A/80/81

Source of Lysogenizing Phage		Lysogenizing Phage	Susceptible to Lysogenizing Phage		Induced by Lysogenization	
Type	Subtype		Type	Subtype	Type	Subtype
52/52A/80/81 (DA 16-7)*	I	S-36	52/52A/80/81	II & IV	52/52A/80/81	I
			52/52A/80	II & III		
			80/81	I & III		
			80/81	II	29/52/52A/80/81/(79)†	
52/52A/80/81 (DA 16-9b)	II	S-85b	52/52A/80/81	I & IV	52/52A/80/81	II
			52/52A/80	I & III		
			80/81	I & III		
			80/81	II	29/52/52A/80/81/(79)†	
52/52A/80/81 (DA 736-8)	IV	None isolated	—	—	—	—

* For details on strains and phages see text and appendixes.
† Weak reaction with 79; variable with 29.

fections in the Atlanta hospital with the 80/81 postsurgical problem.

3. 80/81 Subtypes—Three have been identified among hospital strains. In addition, a fourth subtype has been produced in vitro from three different strains.

(a) Subtype I. Table 3—These strains are characterized by their identity to strain DA 226-6 which shows a distinctive "inhibition" reaction[14] to 1,000 x RTD concentrations of phages 52 and 52A. These strains have not been shown to be lysogenic in spite of intensive efforts to find susceptible cultures. They are lysed and lysogenized by the phages from 52/52A/80 I, II, and III, and 52/52A/80/81 I and II, in each case with conversion to the parent strain. This conversion seems to be identical to one of those reported by Rountree[1] and Asheshov and Rippon.[2] They are differentiated from other 80/81 subtypes by their lytic pattern with phages at 1,000 x RTD and/or by their resistance to phage S-90, the page with which in vitro conversion to 80/81 was accomplished, as will be described later. The majority of our 80/81 strains belong to this subtype.

(b) Subtype II. Table 3 — These strains are characterized by their identity to strain DA 594-8 which gives the lytic pattern 80/81/7/73 with phages at 1,000 x RTD concentrations. They are not lysogenic to any of our strains of the 80/81 complex but are lysogenic to two untypable strains, DA 358-9 and DA 359-9. Details of the latter reactions will be given in another report. Subtype II strains can be lysed and lysogenized by phages from strains of 52/52A/80 I, II, and III, and 52/52A/80/81 I and II. However, in contradistinction to all the other conversion reactions observed in this study the phage pattern of the converted strains is not identical to the pattern of the parent strains of the lyso-

genizing phage. For example: Lysogenization with phage S-41 from 52/52A/80 III strain produced a strain with the phage pattern 29/52/52A/80/(79) and lysogenization with S-36 from a 52/52A/80/81 I produced 29/52/52A/80/81/(79). As indicated by the parentheses around the number, the reactions with 79 were usually weak. Furthermore, the reactions with 29 were somewhat variable, but with 1,000 x RTD phages other faint but critical reactions were apparent. An additional report will be made after further study of these reactions. Subtype II strains are resistant to phage S-90. Four strains of this subtype have been found in our collection. All were isolated on the same day from the air in an operating room of a hospital in Savannah, Ga., in June, 1958.

(c) Subtype III. Table 3—Only the original type of this subtype has been found, i.e., DA 670-9. It is characterized by its lytic pattern of 52/52A/80/81 with phages at 1,000 x RTD, its susceptibility to S-90, and its susceptibility to lysogenization by the phages from 52/52A/80 I, II, and III, and 52/52A/80/81 I and II. Conversion is to the parent strains. It has not been shown to be lysogenic.

(d) Subtype IV. Tables 4 and 5—Three distinct types have been included temporarily in this subtype. They have been identified only after in vitro lysogenization of other strains of the 80/81 complex. No identical strains have been found among many tested from our collection accumulated from 1955-1959 from various state health department and hospital laboratories. Although much work remains to be done to interpret the reactions, the results so far obtained seem to have sufficient basic implications to warrant a preliminary report. The experiment was designed to produce, if possible, an 80/81 strain by lysogenization of any other staphylococcus strain, thereby indicating a possible origin of these common hospital strains. The results herewith reported were obtained with a phage S-90 isolated from strain DA 1203-9 of phage type 80 (no reaction apparent to 81 at RTD). S-90 lyses 52/52A/80 I, II, and III, 52/52A/80/81 I, II, and IV, and 80/81 III. As yet the phage patterns after lysogenization with S-90 have been studied only on the three strains 52/52A/80/81 II and III, and 80/81 III. The strains resulting from these lysogenizations have been designated as subtypes

Table 3—Characteristics of Subtypes of Naturally Occurring Staphylococcus Strains with Phage Pattern 80/81

Strain*				
Type	Subtype	Pattern at 1,000 x RTD	Phage	Susceptible† Strains
80/81 (DA 226-6)	I	52°/52A°/80/81	none isolated	—
80/81 (DA 594-8)	II	80/81/7/73	S-91	DA 358-9‡ DA 359-8
80/81 (DA 670-9)	III	52/52A/80/81	none isolated	—

* For details on strains and phages see text and appendixes.
† Susceptible to phage in preceding column.
‡ Not typable with phages in routine use (see text).
° Inhibition.

Table 4—In vitro Conversion to Staphylococcus Strains with Phage Pattern 80/81

Source of Lysogenizing Phage	Lysogenizing Phage	Susceptible to Lysogenizing Phage		Induced by Lysogenization	
Type		Type	Subtype	Type	Subtype
		52/52A/80/81 (DA 736-8)	IV	80/81	IV A
80 (DA 1203-9)*	S-90	52/52A/80/81 (DA 709-8)	II	80/81	IV B
		80/81 (DA 670-9)	III†	80/81	IV C†

* For details on strains and phages see text and appendixes.
† Patterns with phages at 1,000 x RTD: III = 52/52A/80/81; IV C = 80/81.

IV A, B, and C with histories and characteristics as follows:

(1) Subtype IV A: Strain DA 736-8 of 52/52A/80/81 IV was converted with S-90 to an 80/81 strain which shows "inhibition" reactions to phages 52 and 52A at 1,000 x RTD, reactions characteristic of 80/81 I, the common hospital strain. However, this conversion was not always complete since some of the cells from the lysogenized culture showed very faint reactions to 52 and 52A although they yielded a phage identical or similar to the lysogenizing phage. (The 52 and 52A reactions were evident only with 6-9X magnification.) In contrast to 80/81 I these IV A strains are lysogenic to all subtypes of 52/52A/80 and 52/52A/80/81.

(2) Subtype IV B: Strain DA 709-8 of 52/52A/80/81 II was converted with S-90 to an 80/81 strain which resembles the IV A strain in the "inhibition" reactions to 52 and 52A, the occasional incomplete conversion, and the lysogenicity to all subtypes of 52/52A/80 and 52/52A/80/81. As expected, neither IV A nor IV B is able to lyse the parent strain (DA 1203-9) of the lysogenizing phage. IV B is differentiated from IV A by the fact that it is lysogenic to IV A, a relationship shared by the parent strains of the two subtypes, although lysogenization in both cases was accomplished with the S-90 phage and hence the converted strains carry a common prophage; i.e., IV B [DA 709-8 (S-90)] is lysogenic to IV A [DA 736-8 (S-90)] just as DA 709-8 is lysogenic to DA 736-8. This phenomenon will be reported in more detail after further observation.

(3) Subtype IV C: Strain DA 670-9 of 80/81 III (52/52A/80/81 with 1,000 x RTD phages) was converted with S-90 to an 80/81 strain which does not show the 52 and 52A reactions with 1,000 x RTD phages; IV C is lysogenic to all subtypes of 52/52A/80 and 52/52A/80/81. It is susceptible to IV B with relationships between strains similar to those described between IV A and IV B; i.e., IV B [DA 709-8 (S-90)] is lysogenic to IV C [DA 670-9 (S-90)] just as DA 709-8 is lysogenic to DA 670-9. Further observations on these phenomena will be reported later.

Epidemiologic Application to Hospital Problems

The differentiation into subtypes of strains of the 80/81 complex has proved helpful in clarifying some epidemiologic

problems. For example, in the outbreak of postsurgical infections reported elsewhere[7] epidemiologic studies pointed very strongly to one individual, Surgeon C, as the source of the infections in 13 patients. However, the initial laboratory results showed that the five patients from whom cultures were available were infected with an 80/81 strain while Surgeon C carried a 52/52A/80/81 strain. The strength of the epidemiologic evidence led to additional study of Surgeon C who was then found to carry both the 80/81 and 52/52A/80/81 strains. Subsequent work on the 80/81 strains from Surgeon C and the patients showed all to be subtype I, thus strengthening the evidence that Surgeon C was the source of the infecting organisms. In the meantime, Intern J, who served on the surgical team with Surgeon C, developed a lesion from which a 52/52A/80/81 strain was isolated. It was assumed that Intern J acquired his infecting strain from Surgeon C, but later subtyping indicated that this was an erroneous assumption since the two strains proved to be different subtypes of 52/52A/80/81 (Table 6).

Discussion

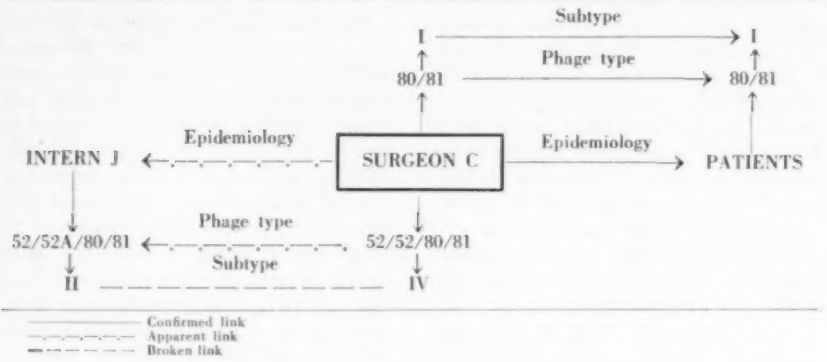
The laboratory investigations reported here were undertaken to determine whether in vivo lysogenizations could explain changes occurring in phage patterns of staphylococcus strains found in nature; e.g., 80/81, 52/52A/80/81, 52/52A/80, and so forth. The demonstrations of in vitro conversions support this hypothesis. It is also supported by simultaneous isolations from one individual of two of these related strains. Both carriers and patients have been observed to harbor two related types either at one site or different sites.[1,2,6] Stronger evidence suggestive of in vivo conversion is afforded by lysogenicity studies such as described by Rountree.[1] She reports on a patient with an 80/81 strain in empyema fluid and a 52/52A/80/81 strain in sputum and was able to convert the former to a 52/52A/80/81 with a phage isolated from the latter. The hypothesis would be further strengthened if two strains with such a lysogenic relationship were isolated from the same site at the same time, although this may be difficult to achieve

Table 5—Characteristics of in vitro Induced Staphylococcus Strains with Phage Pattern 80/81

Strains Induced by Lysogenization with S-90*			Lysogenic to:	
Type	Subtype	Pattern at 1,000 x RTD	Type	Subtype
80/81	IV A	52°/52A°/80/81	52/52A/80	All subtypes
			52/52A/80/81	" "
			80/81	III
	IV B	52°/52A°/80/81	52/52A/80	All subtypes
			52/52A/80/81	" "
			80/81	III, IV A & C
	IV C	80/81	52/52A/80	All subtypes
			52/52A/80/81	" "
			80/81	III

* For details on strains and phages see text and appendixes.
° Inhibition.

Table 6—Use of Subtyping to Clarify Epidemiologic Relationships



since lysogenization and conversion may occur rather rapidly and preclude coexistence of the two strains long enough for in vitro isolation and identification.

Among the cases which we have observed and studied one patient with extensive burns had two strains isolated at different times, one of which was demonstrated to be lysogenic to the other by in vitro tests; i.e., 52/52A/80 to 80/81. In view of the extent of the lesions and limited follow-up studies no clear-cut evidence of in vivo conversion could be established. In another case which will be reported in detail at a later date, an intern has carried simultaneously two types, one of which was lysogenic to the other; i.e., 52/52A/80 to 52/52A/80/81. In other cases which have been studied the individuals with two types had strains of which neither was lysogenic to the other whether they carried the two types at the same time and site or at different times and sites.

It is apparent that dual infection with different types does occur, sometimes without and sometimes with lysogenic relationship between the two strains. The fact that the latter situation has been observed lends support to the in vivo conversion hypothesis as one possible explanation for the naturally occurring variations in phage patterns of the 80/81 complex. The ease with which these strains become lysogenized suggests, as implied by Lowbury and Hood,[9] that phage therapy would result in rapid development of phage resistant strains and would thus be of little value unless a phage could be found which is capable of converting all strains to quite different, less virulent strains. It might be well to mention here that strains with phage patterns including 29 and 79 reported in Tables 1 and 2 are not peculiar to in vitro manipulations but are isolated occasionally from nature.

The present studies point out two important areas of serious potential consequence in the application of phage typing results to the resolution of staphylococcal problems in hospitals: (1) The isolation of two different strains of the 80/81 complex from both carriers and patients; and (2) the existence of distinct subtypes within each of the three major groups; i.e., 80/81, 52/52A/80/81, and 52/52A/80. Both of these problems were encountered in the study of postsurgical infections although in that particular situation the subtyping evidence was of relatively little consequence since the important element was Surgeon C's relation to the patients.

However, in other situations the subtyping, or at least lysogenicity studies, may prove to be the only means of determining the true relationship between personnel and patients, thereby hastening the control of an outbreak or preventing the unnecessary removal of key personnel from duty.

We do not mean to suggest that multiple cultures should be made, multiple colonies picked, and/or subtyping attempted in every case. However, we do believe that our observations reemphasize the need for complete and careful epidemiologic investigations in conjunction with phage typing, for close cooperation between the epidemiologist and laboratorian, and for extremely careful evaluation and special laboratory investigations of situations with such serious implications as the case of Surgeon C.

Summary

52/52A/80/81 and 52/52A/80 staphylococcus strains have been shown to include at least three subtypes each. 80/81 strains include four subtypes, one of which has been found only after in vitro lysogenization.

Lysogenization can be accomplished with phages isolated from the strains themselves, and results in changes in types both within and between the major types. The lysogenized strain usually, but not always, takes on the characteristics of the parent strain of the lysogenizing phage.

Strains of two or more of these major types have been isolated on several occasions from a single individual, either carrier or patient, at the same or different times, or from the same or different sites.

Epidemiologic implications and applications of the subtype, lysogenization and multiple type phenomena are discussed.

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APPENDIX 1

Culture, Source, Date Received:

DA 226-6, Michigan,* 10/26/56; DA 16-7, baby, South Carolina,* 1/24/57; DA 223-8, Georgia,* 4/1/58; DA 412-8, Georgia,* 5/27/58; DA 594-8, operating room air, Georgia†; DA 709-8, abscess, Georgia‡; DA 736-8, nose, Georgia,‡ 11/18/58; DA 779-8, sputum, Georgia,‡ 12/9/58; DA 16-9a, abscess, Georgia,‡ 1/12/59; DA 670-9, nose, Georgia,‡ 6/8/59; DA 1203-9, nose, Georgia,‡ 7/20/59; DA 100-9, nose, Georgia,* 2/9/59; DA 358-9, nose, Georgia,‡ 4/15/59; DA 359-9, nose, Georgia,‡ 4/13/59.

* State Health Department Laboratory.
† CDC, Technology Branch, Savannah, Ga.
‡ CDC Epidemiology Branch, Atlanta, Ga.

Phage, Parent Strain, Propagating Strain:
S-36, DA 16-7, DA 226-6; S-39, DA 779-8, DA 226-6; S-41, DA 412-8, DA 226-8; S-85a, DA 16-9a, DA 226-6; S-85b, DA 16-9b, DA 226-6; S-90, DA 1203-9, DA 670-9, 709-8 and 736-8; S-91, DA 594-8, DA 358-6.

APPENDIX 2

In vitro conversions by lysogenization: Strain and phage.

80/81 - - - - - - - - - - - - - - to - - - - - - - - - - - 52/52A/80

DA 226-6 plus S-39 gives DA 226-6 (S-39) Subtype I
DA 226-6 " S-85a " DA 226-6 (S-85a) " II
DA 226-6 " S-41 " DA 226-6 (S-41) " III
DA 679-9 " Corresponding to DA 226-6 conversions.

80/81 - - - - - - - - - - - - - - to - - - - - - - - - 52/52A/80/81

DA 226-6 plus S-36 gives DA 226-6 (S-36) Subtype I
DA 226-6 " S-85b " DA 226-6 (S-85b) " II
DA 670-9 " Corresponding to DA 226-6 conversions.

52/52A/80 - - - - - - - - - - - - - to - - - - - - - - - 52/52A/80/81

DA 412-8 plus S-36 gives DA 412-8 (S-36) Subtype I
DA 226-6 (S-41) " S-36 " DA 226-6 (S-41) (S-36) Subtype I
DA 779-9 " S-86b " DA 779-9 (S-85b) Subtype II
DA 412-8 " S-85b " DA 412-8 (S-85b) " II
DA 226-6 (S-41) " S-85b " DA 226-6 (S-41) (S-85b) Subtype II

52/52A/80/81 - - - - - - - - - - - to - - - - - - - - - - - 52/52A/80

DA 16-9B II plus S-41 gives DA 16-9b (S-41) Subtype III
DA 16-7 I " S-41 " DA 16-7 (S-41) " III
DA 226-6 (S-85b) II " S-41 " DA 226-6 (S-85b) (S-41) Subtype III
DA 226-6 (S-36) I " S-41 " DA 226-6 (S-36) (S-41) " III

Information on other conversions is available upon request.

Dr. Sakurai is working under the Visiting Scientist Program; Dr. Updyke is with the Staphylococcus and Streptococcus Unit; Dr. Nahmias is with the Epidemiology Branch, Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Chamblee, Ga. Dr. Gerhardt, formerly with the Staphylococcus and Streptococcus Unit, is now with the Department of Bacteriology, Kansas University, Lawrence, Kans.

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Malaria is one of the most important diseases in the world. For this reason the following analysis of the epidemiology and mortality of malaria in Antigua is of interest, particularly in the light of its decline.

EPIDEMIOLOGY AND MORTALITY OF MALARIA IN ANTIGUA, BWI, 1857-1956

K. H. Uttley, M.D., D.T.M.&H.

ANTIGUA, an island of 108 square miles situated in latitude 17° north and 62° east of Greenwich, is one of the Leeward Islands lying between Puerto Rico to the west and the Windward Islands and Barbados to the southeast. The population is at present about 55,000, though a hundred years ago it was 36,400. It fell slowly until 1921, when it was 28,800, but has risen rapidly since the early 30's. Most of the inhabitants are of African descent, and during the years under review the white population never constituted more than 5 per cent of the total. The inhabitants are engaged in the growing of sugar cane and in peasant farming, with fishing as a subsidiary occupation. Twenty-two per cent of the population live in the only town, the remainder in about 40 well circumscribed villages evenly distributed over the island, a somewhat unusual feature of the smaller West Indian Islands, where the populations are usually scattered along the coast.

Geologically the island is divided into three clearly defined areas: a limestone area in the northeastern third, a central low-lying plain of black loam and heavy clay, and a southwestern volcanic, rugged, hilly region with steep-sided valleys separating the mountain ridges. In this last area the ground swells to which the western side of the island is sometimes subjected have filled in the bays with a sandy detritus and have enclosed salt ponds and brackish lagoons behind sand bars, making ideal breeding places for certain of the island's anopheline mosquitoes.

Climatology of Antigua

In general, Antigua having no high hills to shut out the northeast trade winds, the climate is not as hot and humid as most of the lands of the Caribbean. Temperatures as high as 93° F and as low as 60° F have been occasionally recorded, but there is not commonly a variation of more than ten degrees about the annual mean of 79° F. The average annual rainfall is 43.3 in., about half of which falls between August and November; the driest months are from January to April (see Table 2). The runoff is rapid after a rainfall and within a few days the soil looks very dry; consequently, water does not collect for long in streams or ditches, though a number of man-made ponds scattered about the island maintain collections of water all the year round. There are no permanent streams. The hills (maximum 1,330 feet) are not high enough to attract a cloud cap and therefore do not enhance the precipitation of rain to any extent, which is much below

the average for the West Indies. Variations in the amount of the annual rainfall are considerable and the island is subject to long periods of severe drought every few years.

The Survey

As in most of the smaller West Indian Islands, official records in Antigua do not go back very far and have not been carefully compiled, consequently, data about the morbidity and mortality of malaria do not exist to any great extent except in so far as death registration is concerned. However, registration of births and deaths has been enforced since 1856; it quickly became accurate, more especially as regards deaths, because no dead body could be buried without a burial order, which could not be supplied except on presentation of a doctor's or coroner's death certificate. In addition to this, Antigua has been fortunate in that over the last one hundred years, if not longer, there has been an adequate number of competent physicians, so that the diagnoses on the death certificates have been reasonably accurate according to the views and experience of the times, though the microscope was probably not used in Antigua until the time of the First World War.

The Antigua material on which this survey is based has been obtained by the author during a perusal of all the entries in the registers from 1857 to date, during which he has extracted the necessary information about malaria, ague, remittent fever, black water fever, and the other synonyms under which the disease was known during the 19th century. Only persons of African descent are under consideration in this paper in so far as Antigua is concerned, and where comparisons are drawn with other territories, an attempt has been made, as in the case of British Guiana, to restrict comparisons to persons of African descent (Table 1).

Table 1—Antigua, Age at Death from Malaria, by Sex, 1857-1956

Age Group	Males	Females	Expressed as a Per cent of the Total Malaria Deaths
0- 4	228	234	33.9
5- 9	92	76	12.3
10-14	52	47	7.3
15-19	50	44	6.9
20-24	38	49	6.4
25-29	26	28	4.0
30-34	17	22	2.9
35-39	18	20	2.8
40-44	25	25	3.7
45-49	12	30	3.1
50-54	17	22	2.9
55-59	14	26	2.9
60-64	26	27	3.9
65-69	11	18	2.1
70-74	15	20	2.6
75 and over	9	25	2.5
Total	650	713	1,363

Comment: Malaria was especially fatal in the early years of life; after adolescence its mortality remained fairly steady until late in life. An examination of the eight censuses taken in Antigua since 1861 shows that less than 10 per cent of the population has been aged 55 years or over, so that one can conclude from the table that the mortality increased somewhat in the elderly, but apart from this it is remarkable how steady the rate was in the middle decades of life. Because of the predominence of adult females in those aged 15 years or more, the difference in the numbers of males and females who have died from malaria is not significant.

The middle six months of the year had the smallest mortality, but the disease was a killing one all the year round. The wet season begins in August and lasts until December, while the malaria mortality begins to rise three or four months later (Table 2).

Table 3 shows the malaria death rate per 100,000 living for each year from 1857 to 1948, when the last death occurred. The annual rainfall in inches for each year from 1874, when it was first recorded, is also set down.

The calculation of the coefficient of correlation between years of high and low rainfall with those of high and low malaria mortality shows that there is no association of any statistical significance, but if the calculation of the monthly deaths with the monthly rainfall for the same or preceding months is made, there is the following association:

Malaria mortality of one month, correlated with the rainfall of three months previously. r=0.69 (S.E. is 0.30).

Malaria mortality of one month, correlated with the rainfall of four months previously. r=0.73 (S.E. is 0.30).

Malaria mortality of one month, correlated with the rainfall of five months previously. r=0.61 (S.E. is 0.30).

The values for other correlated months have no association of statistical significance. The material on which these conclusions are based is shown in the following tabulation:

Month	Deaths from Malaria, 1903-1948	Mean Recorded Rainfall, in Inches, 1903-1952*
January	134	2.28
February	83	1.45
March	94	1.47
April	63	2.16
May	59	3.65
June	51	3.32
July	59	3.20
August	50	4.44
September	50	5.28
October	72	5.00
November	98	5.38
December	106	3.16
Total	919	40.79

* 1903 is the earliest year for which monthly rainfall figures are available. Only the 50-year averages are accessible to the author.

Mosquito Vector in Antigua

The main vector in Antigua was Anopheles aquasalis (Charles, 1952), but severe epidemics have occurred where Anopheles albimanus was the only anopheline present. Antigua is almost at the southerly limit in the Caribbean islands to which A. albimanus extends. Charles and Senevet (1953) established that in the Caribbean it is limited to the Greater Antilles (i.e., to Jamaica, Cuba, Puerto Rico, and San Domingo), the Leeward Islands, Guadeloupe, and Marie Gallante. It is not met with in the Windward Islands or further south. Anopheles aquasalis has a wider distribution and is probably found in every Caribbean island. It is the only vector in the Windward Islands (Charles, 1952) which lies to the southeast of the Leeward Islands. Anopheles albimanus breeds in and is the most common anopheline in the shallow fresh-water ponds and sluggish or stagnant streams. Charles found it in the vicinity of every inhabited locality in Antigua. Anopheles aquasalis is found in the brackish mangrove swamps beside the sea and also in the sluggish or stagnant temporary streams on the east and south of the island, very often in association with A. albimanus. Both species are found in artificial containers of water near estates and villages, and both breed all the year round. Anopheles argyritarsis has not been found infected in Antigua and is not nearly as common as the other two species, but in view of its behavior elsewhere in the Caribbean it was under suspicion in Antigua. All three species of mosquito are zoophilic.

Parasite

In Antigua in recent times the parasites were Plasmodium falciparum and Plasmodium malariae in the proportion of two to one (Charles, 1952). He did not find Plasmodium vivax in 915 positive blood films, nor yet, as he states, in ten years of blood film examinations. By contrast, however, McDonald (1922) found all three parasites in the proportions of 61 per cent P. falciparum, 28 per cent P. malariae, and 11 per cent P.

Table 2—Seasonal Death Rate from Malaria, Monthly Rainfall in Inches, Antigua, 1857-1956

Month	Number of Deaths	First Quarter =100	Rainfall in Inches (Average of 1903-1952)	Fourth Quarter =100
January	192		2.28	
February	116		1.45	
March	136		1.47	
1st Quarter	444	100	5.20	38
April	80		2.16	
May	75		3.65	
June	72		3.32	
2nd Quarter	227	51	9.13	67
July	93		3.20	
August	81		4.44	
September	98		5.28	
3rd Quarter	272	61	12.92	95
October	116		5.00	
November	150		5.38	
December	154		3.16	
4th Quarter	420	95	13.54	100
Total	1,363		40.79	

vivax in 300 positive blood films. The relatively high incidence of P. malariae in Antigua was considered in the past as one of the possible causes of the nephritis of children prevalent at that time; a similar state of affairs has prevailed in the neighboring island of Dominica.

A like change-over in the type of parasite usually found in the blood films has been occurring in other West Indian Islands and may in some instances, though not in Antigua where the change-over occurred too early, be due to the use of the new antimalarial drugs on a large scale.

In Grenada, a highly malarious island, a survey by Earle in 1932 showed 90 per cent of positive films to be due to P. falciparum, whereas previously over many years P. vivax and P. falciparum were present in equal numbers, along with a few P. malariae. A possible explanation may be concerned with the time of year of Earle's survey, though I think that this is unlikely. In the French islands P. vivax was very common until 20 to 25 years ago, when a change-over occurred to P. falciparum (see Montestruc (1936) and Montestruc (1947) for Martinique, and Sautet (1951) and Languillon (1951) for Guadeloupe).

Morbidity of Malaria in Antigua

Few departmental records have survived for more than a decade or so; consequently, it is not possible to form

an estimate of the extent to which malaria has been present in the community in the past, though Charles (1952), when making his survey of the colony, was able at that time to assemble sufficient data to conclude that for the years 1933-1942, the average for the decade was around 4,800 cases per 100,000 annually, varying from 10,260 in the epidemic of 1936 to 1,289 in 1941. No indigenous malaria has occurred since 1952. There is no means available for assessing the degree to which malaria was present in the population before 1930; since that date the situation has been materially affected by the advent of the synthetic antimalarials, followed later by antimalarial campaigns. Comparable data from other Caribbean territories follow.

Mortality

Leeward Islands

St. Kitts (Christopher)—There has been no death from an indigenous case since the epidemic of 1897.

Nevis—There has been no death since 1946. Before that date and since 1918, the mortality fluctuated from a maximum of nine deaths to an average of two or four a year. The population of the island is 12,000.

Montserrat—This island is usually considered to be free from malaria, but a localized outbreak due to P. falciparum occurred in one village in the late 30's and early 40's when the mortality rose in one year to 33 deaths.

Windward Islands

Grenada—This has always been a highly malarious island.
1923-1932 the mortality was 96 per 100,000.
1933-1942 the mortality was 89 per 100,000.
1949-1953 the mortality was 53 per 100,000.

St. Vincent—
1933-1942 the mortality was 8 per 100,000.
1943-1952 the mortality was 3 per 100,000.

St. Lucia—
1933-1942 the mortality was 200 per 100,000.
1948-1956 the mortality was 84 per 100,000.

Dominica—
1933-1942 the mortality was 101 per 100,000.
1946-1954 the mortality was 67 per 100,000.

(Note: Certain of the preceding figures are from Charles, 1952. The others are from the annual reports of the medical departments of the colonies concerned.)

Barbados

No indigenous cases have been reported since the end of the 1927 epidemic, occasioned by the return of individuals infected with P. falciparum from Cuba, at the same time that A. albimanus was brought in sloops from neighboring islands. It was quickly controlled.

Jamaica

	Medically Certified Malaria Deaths per 100,000 Living	Ratio of Medically Certified Natural Deaths to Total Number of Natural Deaths, in Per cent
1881-1886	18	16.1
1886-1890	40	19.4
1891-1895	37	22.7
1896-1900	40	21.8
1901-1905	42	20.0
1906-1910	52	21.6
1911-1915	43	26.4
1916-1920	41	26.8
1921-1925	41	27.2
1926-1930	30	28.7
1931-1935	45	36.4
1936-1940	44	45.5
1941-1945	42	48.6
1946-1950	41	54.7
1951	34	57.7
1952	46	60.1

Because the proportion of deaths certified by doctors is a small one in Jamaica, these figures do not indicate much more than that malaria mortality has probably been fairly constant over the period.

British Guiana

Negro population only.
1930-1938 the mortality averaged 431 per 100,000.*
1944-1946 the mortality averaged 88 per 100,000.
1952-1954 the mortality averaged 1 per 100,000.

Dutch Guiana

1939-1946 the mortality averaged 98 per 100,000 (WHO, 1952).

* This included undefined fever.

Table 3—Death Rate from Malaria and the Rainfall for Associated Years, Rainfall Recorded Only from 1874

Year	Death Rate from Malaria per 100,000 Living	Annual Rainfall in Inches	Year	Death Rate from Malaria per 100,000 Living	Annual Rainfall in Inches
1857	6		1907	49	43.5
1858	17		1908	65	43.8
1859	8		1909	109	45.2
1860	11		1910	41	34.8
1861	11		1911	49	36.5
1862	8		1912	43	32.2
1863	3		1913	30	42.8
1864	3		1914	23	36.9
1865	25		1915	20	56.1
1866	17		1916	243	58.2
1867	20		1917	149	36.6
1868	3		1918	78	37.9
1869	6		1919	73	49.6
1870	9		1920	83	30.1
1871	9		1921	59	30.3
1872	20		1922	20	35.1
1873	0		1923	13	32.4
1874	9	31.2	1924	20	41.6
1875	23	28.8	1925	23	30.8
1876	6	42.0	1926	42	50.2
1877	18	49.1	1927	149	48.2
1878	6	47.1	1928	119	33.2
1879	23	61.5	1929	31	40.8
1880	12	49.7	1930	27	25.5
1881	12	53.8	1931	15	48.6
1882	9	33.0	1932	151	58.5
1883	12	55.5	1933	76	41.5
1884	26	44.0	1934	41	41.9
1885	9	43.4	1935	14	38.3
1886	28	47.8	1936	107	60.0
1887	34	43.7	1937	131	47.3
1888	17	44.2	1938	39	44.8
1889	50	73.6	1939	24	29.7
1890	47	33.0	1940	35	37.4
1891	58	50.0	1941	27	49.4
1892	44	38.4	1942	50	50.0
1893	53	38.7	1943	68	49.1
1894	42	38.9	1944	33	37.1
1895	76	52.9	1945	10	40.9
1896	46	59.9	1946	5	37.1
1897	51	39.7	1947	2	28.8
1898	45	48.9	1948	5	36.4
1899	64	47.5			
1900	79	37.0	No death from malaria since 1948		
1901	152	57.6	No indigenous malaria since 1952		
1902	147	56.0			
1903	140	43.7			
1904	54	37.0			
1905	70	31.4			
1906	61	53.9			

Trinidad

1938-1940 the mortality averaged 98 per 100,000.
1941-1945 the mortality averaged 161 per 100,000.
1946-1950 the mortality averaged 59 per 100,000.
1951-1955 the mortality averaged 20 per 100,000.
1956 the mortality averaged 3 per 100,000.

American Virgin Islands

One death occured between 1939 and 1946 (WHO, 1952). The population is 27,000.

Mosquito Vectors in the Caribbean Area

In order that a true perspective of events in Antigua may be obtained, it is necessary to give the following brief outline of the vectors in this part of the world: (1) = A. albimanus; (2) = A. aquasalis; (3) = A. argyritarsis.

Leeward Islands

Antigua—(1), (2), and (3), Charles (1952).

St. Kitts, Nevis, Anguilla—(2) which is rare in St. Kitts, Charles (1952).

Nevis—(1) and (2), Charles (1952).

Montserrat—(1) and (2), Charles (1952).

Windward Islands

Grenada—(2) is the only vector, Charles (1952). (2) is always found with malaria, Earle (1932) and (1936). (3) and Anopheles pseudopunctipennis present, Root and Andrews (1938).

St. Vincent—(2) and (3), with the latter predominating, Charles (1952).

St. Lucia—(2) and (3), Charles (1952).

Dominica—(2) and (3), Charles (1952).

Barbados

A. albimanus is now absent from the island, though it was introduced in 1927, when it gave rise to the epidemic of that year, Rozeboom (1953).

Trinidad

(2) and Anopheles bellator, Stage and Gillette (1947); Downs, et al. (1944); Gillette (1945); Verteuil and Spence (1937); Verteuil (1925).

British Guiana

Anopheles darlingi is the most dangerous vector, Giglioli (1938). Since Giglioli's paper, the antimalaria campaign in British Guiana has almost eliminated malaria with the mosquito vector.

Puerto Rico

(1) Earle (1939); Stephens and Pratt (1947); (1) and Anopheles grabhamii, Root (1922).

American Virgin Islands

In St. Croix, "A. albimanus has been recently introduced and is now a vector," Hayes (1930); Lowman (1929). Since these papers were written an antimalaria campaign has eliminated the mosquito.

Cuba

(1), Carr and Hill (1942). Anopheles vestipennis, Meléndez (1946).

Haiti

(1), U. S. Nav. M. Bull. (1933), (1) and A. grabhamii, L'Herisson (1934); Butler and Peterson (1927).

Dominican Republic

(1), Mackie, et al. (1951); Caldwell (1945); Caldwell (1946).

Jamaica

(1).

French Territories

Guadeloupe—(1), (2), and (3), Sautet (1951); Languillon (1951).

Martinique—(2) is the chief or only vector, Montestruc (1947).

French Guiana—Anopheles darlingi, Floch (1947).

Dutch West Indies

Surinam—(2) and (3) are the most important vectors, Urchs (1927); Bonne (1924); Bonne-Webster and Bonne (1921).

Netherlands Antilles—No malaria present, though A. pseudopunctipennis is found, Van der Kuyp (1956).

Bermuda

No malaria vector is present, Langrishe (1924).

These species are all met with on the South and Central American mainland in different areas and in varying degrees of frequency. For good reviews of the mosquitoes of the region see Senior-White (1950) and Komp (1942).

Summary and Conclusions

A survey of the death registers of Antigua for the last one hundred years shows that during that period malaria has been moderately prevalent until the last eight years, when it appears to have died out.

Data from other territories confirm that the malaria mortality was falling rapidly, even before the recent large scale antimalaria campaigns initiated since the Second World War by the World Health Organization.

As in most other countries the mortality from the disease fell most heavily on the infant and young child. Its mortality at adult ages appeared to be remarkably uniform until late life.

A comparison with other West Indian Islands shows that malaria mortality varies and has varied enormously, being normally absent in Barbados, whereas in Grenada and St. Lucia the rate is still very high.

Earlier workers showed that in Antigua the main mosquito vector was A. aquasalis, though A. albimanus was on occasion the only mosquito present during severe epidemics. Anopheles argyritarsis has not been found infected in Antigua, though on epidemiological grounds and by analogy from neighboring territories it may have been an occasional vector. These findings by others for Antigua are compared in this paper with similar data from other territories in the Caribbean area, and as would have been expected, Antiguan experience was typical of what has happened and is happening in the Caribbean.

During the last 20 or 30 years of malaria prevalence in Antigua there were indications that the predominant species of malaria parasite changed. This happened also in other Caribbean islands. Whereas in the latter this may have been due to the use of the newer synthetic antimalarials, the change over in Antigua probably occurred before the advent of the drugs.

In the first paragraph of these conclusions I have advisedly stated that ". . . malaria . . . appears to have died out," because the three species of mosquito involved in the spread of malaria in the island have by no means been completely eliminated and, because of their zoophilic habits, their complete destruction is not possible with the current limited financial resources of the island. It needs merely some slackening of effort on the part of the antimalaria gangs, combined with the arrival of an imported mild case of malaria to precipitate a fresh epidemic, more especially as any relative immunity or premunition that may have been possessed by the population at large becomes lost with the passage of time.

In Antigua, as elsewhere in the Caribbean, malaria was a disease of the autumn and winter, though it was liable to be present all the year round. The time of maximum mortality was associated with a time lag of three to four months after the onset of the rainy season.

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Dr. Uttley is senior medical officer, Medical Department, St. John's, Antigua, West Indies.

A program for prevention of heat illnesses at an air force base is presented below. This is a clear account of prevention applied to an occupational situation.

SUCCESSFUL PREVENTIVE MEDICAL MEASURES AGAINST HEAT ILLNESS AT LACKLAND AIR FORCE BASE

Robert B. Stonehill, Lt. Colonel, USAF, MC, and Philip G. Keil, Colonel, USAF, MC

HEAT ILLNESS is a fascinating and sometimes catastrophic, preventable predicament to which the human body is vulnerable. In the summer of 1956, the Medical Department at this base became acutely aware of the heat illness problem when 13 heat stroke cases and two deaths occurred. During the period 1956-1957, with the closing of the other two basic training centers of the Air Force, Sampson (upstate New York), and Parks (central California), an influx of basic airmen reported to this base who were not acclimatized to heat or physically conditioned for arduous physical training. Thirty-nine heat strokes with no deaths occurred during the summer of 1957 in spite of a Preventive Medical Program. Due to the number of cases of heat exhaustion and heat stroke recorded during the summers of 1956 and 1957, a more vigorous program was instituted during the summer of 1958 which effectively emphasized their prevention. The Dry Bulb Temperature Index was replaced by the Wet Bulb Globe Temperature Index (WBGT),[1] as an indicator for modifying the training program. The outcome of this program proved so successful it is being reported for possible utilization at other sites with potentials for heat illness.

The manifestations of heat illness were of three principal types, all resulting from the body's inability to adjust to exposure and physical stress under high or excessive environmental heat load. First, heat cramps resulted in cramping pains of the skeletal or abdominal musculature and nausea. There was no accompanying significant alteration of body temperature. The patients had invariably perspired excessively and had replaced the fluid loss without adequate replacement of salt.

Second, and most frequently noted, was heat exhaustion. While the rectal temperature was elevated the patients generally were sweating intensely, were reasonably cool to touch, and had evidence of mild peripheral circulatory collapse. Hyperventilation, lassitude, fainting, and mental confusion were frequent, and most men complained of headache.

Finally, heat stroke was the most alarming condition which we encountered. It constituted an acute emergency. In these cases there was a breakdown of the body's heat regulation mechanism with complete cessation of sweating. The bodily temperatures climbed rapidly, often to alarming heights (over 110° F rectally). Consequently, the skin, including even that of the axillae and groin was hot and dry. The pulse was often rapid and thready, and peripheral circulatory col-

lapse was frequent. Headache, nausea, mental confusion and coma were also frequent. The immediate medical attention was directed toward rapid lowering of the body temperature and correction or prevention of circulatory collapse. In this situation time was of the essence and immediate therapy of paramount importance.

When an individual is initially exposed to a significantly increased heat load he is more prone to suffer heat illness because he has not had time for the physiologic adjustment to the added environmental stress. Experimental work in human volunteers has shown that this adaptation takes place at a fairly rapid rate; it is largely accomplished within four days and is virtually complete within one week.[2,3] During this time moderate work done at frequent intervals increases his adjustment. The volume of extracellular and circulatory fluid increase and the amount of sodium chloride in perspiration decreases.[4,5] Thus in acclimatization, evaporative heat loss becomes more efficient without impairing the circulatory capacities. This adaptation will remain for about two weeks after the person is removed from the hot environment.

Individuals who are obese or debilitated are more prone to heat illness.[6] Also more vulnerable are individuals from temperate climates, and patients with widespread skin disorders such as miliaria.[7,8] Periodic interruption of the excessive heat load will allow more individuals to function for longer over-all periods under heat stress.[2]

Based upon these patterns and the presence of a definite problem, a program of prevention was instituted at this base in 1957. Education of the training instructors and troops acquainted them with the types and characteristics of the heat illnesses and their prevention. Personal hygiene was emphasized as well as the importance of reporting for heat rash treatment. When personnel were in direct sunlight helmet liners were worn as head protection. Washed, nonstarched, fatigue uniforms were utilized to aid in increasing clothing ventilation. Overweight individuals were given special scrutiny and advice. Adequate water and supplementary salt intake were made available to the troops. In addition, arduous physical exertion such as calisthenics and field training was scheduled in the cooler parts of the day, and outdoor training was discontinued when the dry bulb temperature reached 95° F. In spite of these provisions, 39 cases of heat stroke occurred in 1957, and were given emergency treatment consisting of immediate whole body icing, I. V. fluids and the treatment or prevention of shock. Complications consisting of four cases of pulmonary edema and two cases of peripheral nerve palsy occurred. Five patients had rectal temperatures of over 107° F, at institution of therapy. One patient had an initial temperature of over 110° F. The lack of mortality can be attributed to the rapid recognition of the syndrome and the immediate, intensive action taken.

Before the onset of the summer of 1958, the preventive medical program was improved and modified. There was no reason to believe that there would be any significant variation of heat load between the summers of 1957 and 1958. This belief was subsequently substantiated (Figure 1). Troop strength during the corresponding months of these two years was comparable (Table 1).

Minor revisions of the heat illness prevention program consisted of increased availability of water and supplementary salt tablets, the removal of fatigue shirts during classroom lectures, and the postponement of arduous physical outdoor activities until after the first week of training. Outdoor physical training was scheduled during the morning hours from 0600 to 1000 hours and after 1800 hours, if necessary.

The major change in 1958 consisted

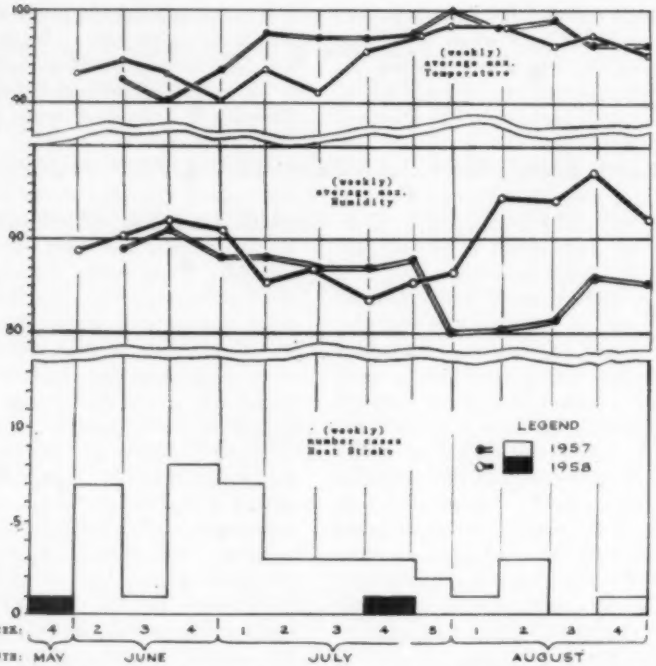

Figure 1—Comparison of Weather Conditions and Cases of Heat Stroke, 1957-1958

of the use of the Wet Bulb Globe Temperature Index of Yaglou to determine environmental heat load in place of the dry bulb temperature.[1] Half-hour computations of the wet bulb globe temperature were made by enlisted technicians. They utilized the dry bulb temperature, the wet bulb temperature (dry bulb in a wet wick which was rotated for evaporation), and the globe temperature. This last reading was taken from a thermometer which was inserted in a six-inch copper globe painted flat black and exposed to direct sunlight and air movement.

The human being loses or gains heat by conduction, convection, radiation, and evaporation. The dry bulb measures the temperature of the air surrounding the body. When this is less than body temperature, heat is lost by conduction to the air. When it is higher than body temperature, heat is gained. The wet bulb temperature estimates the humidity of the air. The lower the humidity the greater the evaporative loss of fluids from the skin and the greater the heat loss. The globe temperature estimates the effects of radiant heat and air movement (convection). The Wet Bulb Globe Temperature Index was calculated as follows:

WBGT = 0.7 wet bulb temperature + 0.2 black globe temperature + 0.1 dry bulb temperature (shade).

When the WBGT Index reached 88 degrees red flags were run up on standards at strategic sites on the base and outdoor training activities were termi-

Table 1—Troop Strength

1957		1958	
May	7,849	May	7,856
June	10,814	June	9,245
July	14,788	July	12,582
August	11,644	August	12,429
Total	45,095	Total	42,112

nated until the index was again below 88 degrees.

Results

During the summer of 1958 only two cases of heat stroke occurred. On May 27, a 19-year-old white basic airman was admitted to this hospital with a temperature of 107.8° F, dry skin and other manifestations of heat stroke plus an acute pharyngitis. Later investigation proved that he had multiple congenital ectodermal defects, including the absence of some teeth, absence of sweat glands, scanty hair and normal pigment. He had originally come from Illinois and had been on the base 30 days prior to admission.

The second case of heat stroke occurred on July 21 in an 18-year-old white basic airman from northern Michigan who had been on the base for two days. During the time he was on the base he was occupied largely by being issued uniforms and gear and some orientation lectures. His admission temperature was 108° F. He had all the manifestations of heat stroke including severe mental confusion. Subsequently, this patient developed a lower nephron nephrosis which required the use of the artificial kidney for ten days prior to recovery.

Members of the Navy Medical Department previously reported the successful use of the Wet Bulb Globe Temperature Index at Parris Island. Their index reading at which outdoor activities were terminated was 88° F, or above.[9] Similarly, when the WBGT reached 88° F outdoor activities at Lackland Air Force Base were terminated and classroom-type instruction was carried on. The outdoor physical training consisting of calisthenics, marching, drill, survival course participation, cliff climb, and rifle range practice was scheduled from 0600 to 1000 hours. During the months of June, July, August, and September training activities were halted six times as a result of the use of the Wet Bulb Globe Temperature Index. A total of six hours was lost from this scheduled training period (Table 2). The time was made up after 1800 hours when the WBGT was below 88° F.

Summary

Because of a heat illness problem of significant magnitude observed during the summers of 1956 and 1957, an intensive medical preventive program was instituted at Lackland Air Force Base,

Table 2—Hours of Training Lost—1958 Program

(1000 Hours Cut-Off—88° Temperature WBGT)

Week	1	2	3	4	5	
Month						
June	0	0	0	0	0	
July	0	0	0	½	1½	
August	1	1½	½	0	0	
September	0	1	0	0	0	
Total	1	2½	½	½	1½	(6 hr)

No time would have been lost in 1958 by 1000 hours had the dry bulb temperature index of 95° been used. The temperature did not reach 95° until later in the day.

No hours lost in 1957 by 1000 hours at the cut-off temperature reading of 95° F. The earliest hour the 95° temperature was recorded was at 1200 hours in July and August.

the Basic Military Training Center for the United States Air Force.

Unacclimatized individuals were exposed to the semitropical summers while completing basic military training entailing considerable physical exertion. Experience in 1957 demonstrated that immediate intensive treatment of cases of heat stroke could prevent death. However, these individuals were subsequently prone to severe heat illness and, therefore, vulnerable to future exposures to heat.

The Preventive Medical Program initiated in 1957 and modified in 1958 contained numerous facets to develop adequate heat adaptation, including supplemental salt and water intakes, adequate clothing protection from direct sunlight, postponement of arduous activities until after the first week of training, and elimination of outdoor physical activities during the most severe heat loads.

The WBGT Index developed by Yaglou was used as an indicator of environmental heat stress. When this index reached 88° F, or above, arduous, outdoor, physical activities were terminated. As a result of this program, only two cases of heat stroke occurred, one of which was not preventable in any preventive medical program. Time lost from training was negligible.

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ADDENDUM

As a result of the continuation of this preventive medical program during the summer of 1959, only three cases of heat stroke were encountered.

The authors are with the Department of Medicine, United States Air Force Hospital, Lackland, Lackland Air Force Base, Tex.

This paper represents the personal viewpoints of the authors and is not to be construed as a statement of official Air Force policy.

Job classification schemes and how to use them is a topic not often dealt with in the public health literature. Yet there is no doubt that the topic is of considerable practical importance, and we are pleased to be able to offer this discussion in the Journal.

CAREER SERVICE CLASSIFICATION

J. J. Donovan

I SHALL DISCUSS the subject of career service classification under two principal headings: (1) Why and how positions in the public service are classified; and (2) how a pay plan is tied into a job classification plan.

In this discussion, I shall also touch on some of the special problems of position classification and compensation that relate to professional positions in the public service, including public health veterinarians. We know, for example, that the public service in general has fallen behind private industry in the ability to attract and hold professional people in career fields. We also know that, in today's fast-moving tempo, many new professional and technical fields of specialization are emerging which were unknown as little as twenty years ago. Some of these emerging specialties are still passing through an evolutionary stage. This makes it correspondingly more difficult for the personnel office to classify them properly and determine equitable rates of pay. For example, the field of veterinary public health medicine—or "comparative medicine"—is relatively a youngster in the world of medical science, and this is a problem to be recognized and overcome.

But now, let us turn to the theory and practice of position classification. Let us see what answers there are to questions like "Why have a classification plan?," and "What is a classification plan used for?" After that, I shall talk about how a classification plan and a pay plan are tied together.

What Is Position Classification?

Much has been written on the subject of position classification. To lay the foundation for our later discussion, however, I think it would be helpful to summarize quickly the nature and uses of a position classification plan. In an article which appeared some few years ago in this Journal,* Norman Locke summed up very well the essence of a classification plan. I quote briefly what he said there:

> "Position classification, in its simplest terms, consists of the orderly arrangement by duties and responsibilities of the positions of an agency. This arrangement of positions is called the classification plan, a plan that can be put to many administrative uses and can be of considerable value to the health officer. For example, the pay plan, or the proper salary level of all classes of positions, can be determined by referring to the duties and responsibilities of each class of position. Employee selection can be simplified by the plan, for a given set of duties and responsibilities carries with it a statement of the minimum requirements of training and experience required for the successful completion of those duties.
>
> The classification plan reveals the ladders of promotion from one position to the other merely by scanning the hierarchy of duties in the plan. Programs of employee training and orientation may be based on the responsibilities of positions in the plan, and directed toward the development of the skills demanded by those responsibilities. Likewise, the employee service rating or efficiency rating program becomes consid-

* Locke, Norman. Classifying Health Agency Positions. A.J.P.H. 39, 10:1331-1334 (Oct.), 1949.

erably clarified by keeping in mind the requirements of the position in which the employee is being rated. The classification plan has been found to be of help in simplifying the budget process, by supplying the administrator with a common title for common positions. Further, an organizational use has grown out of position classification, the process of placing duties and responsibilities having been found to reveal weaknesses or faults in the organizational structure."

The Job vs. the Man

Notice that Mr. Locke's description of a classification plan refers to the duties and responsibilities of the position —not to the employee who happens to be in the position at any particular time. This may appear to be an artificial and unnatural approach—divorcing the job from the man or woman who holds it. But please remember: Every staff job in an organization from top to bottom was first vacant before it was ever filled. It was first an idea in someone's mind, a gleam in someone's eye. Someone had to sit down and map out the job before anyone could move ahead to find the person to fill it. Over the years, of course, jobs change with changing organizational needs. As time passes, jobs inevitably show the imprint of the people whose talent and energies have expanded the scope of their jobs and increased their value to the organization. Looked at it in this light, focusing attention first on the job rather than on the man in the job makes sense from the management point of view.

In one sense, at least, jobs are like houses. If we ask a friend what kind of a house he lives in, we would hardly expect him to say "It's a $20,000 house" and let it go at that. We would expect him to say something like this: "It's a Cape Cod Colonial, with two bedrooms and a bath, a recreation room and a one-car garage, on a 60-foot lot." Then we have a mental image of what he is talking about; we can visualize his house as distinguished from other $20,000 houses.

The same is true of a job. To classify it properly requires detailed information about the duties and responsibilities, about the amount and kind of supervision that is received and exercised, about the degree of skill required, the amount of freedom to use independent judgment, the consequences of decisions, and many other similar intimate details. When the agency responsible for classifying jobs has assembled these data, it is then possible to make an accurate and intelligent grouping of jobs within the framework of a classification plan.

Management Makes the Jobs

This leads to a point that often causes misunderstanding. It is the ultimate responsibility of management—not the personnel office—to decide how many employees to hire and how their work is to be organized. In other words, the administrative director of a public health agency is the person who should decide how many employees he can employ under his budget, and what their duties should be. The personnel office, however, can assist the public health director by classifying the different jobs in his organization.

The point is soon reached where it becomes necessary to make a decision as to how many different kinds of jobs will be formally recognized within a particular organization. The number of job classes will depend partly on the size of the organization, of course, but there is no standard formula for arriving at an answer. In the final analysis, a decision rests on the informed judgment of top management with the advice and counsel of the personnel agency. Ultimately, let us say, agreement is reached that in a public health agency which has a total staff of 75 people, there are 18 separate kinds of jobs. Some of these jobs are one-of-a-kind specialties; in other instances, the facts may show that a half-

dozen people are all doing essentially the same kind and level of work.

But whatever the decision may be as to the number of different jobs there are in the organization, when a particular job has been recognized for purposes of separate treatment in the classification plan, these three steps follow:

1. A written job description is prepared which portrays the job in concise, clear-cut terms.
2. A suitably descriptive title is selected for the job-class which, ideally, is sufficiently informative in itself to distinguish it from other related jobs.
3. The positions in the organization are assigned to the standard job class that most closely fits their particular duties.

In the language of the personnel man, the term "job class" means a group of positions which are closely similar in duties and responsibilities. The similarity should be close enough so that each position in the group (1) can be given the same job title; (2) requires the same education and experience; (3) can be filled by substantially the same tests of ability or selection methods; and (4) is of a similar level of job worth and therefore deserves the same salary range. This definition provides the working yardstick for grouping two or more positions into a single class, or when the facts warrant it, separating several positions into more than one class. For example, in a public health agency, there may be two or more related job classes in the same general field, but at different levels of responsibility, such as Public Health Veterinarian I, II, and III. Again, in a small organization it may be necessary to merge the duties of laboratory assistant and laboratory technician into a single job.

Keep the Plan Current

An accurate, useful position classification plan is by its very nature dynamic —a tool of everyday management. Organizations are not static structures; they are constantly undergoing changes in size, functions, and demands on their facilities. Sometimes these changes are so gradual that they are almost imperceptible from month to month; sometimes they are sudden and dramatic, as when a public health agency is mobilizing all of its resources to combat the outbreak of a normally rare disease.

The essential point here is that a position classification plan must be kept abreast of changing times and changing conditions, or it will soon be as out-of-date as last year's calendar. A good share of the problems of classification and pay administration can be traced to the fact that the agency is trying to operate within the framework of a classification plan that has been allowed to become hopelessly obsolete. It is considered desirable practice in the personnel field to review the position classification plan constantly, making changes and adjustments where they are needed. Sometimes, unfortunately, this worthy objective is stymied by lack of manpower and funds, not by ignorance of the problem.

Sound Pay Plan Features

But where does all this elaborate classification procedure lead? How does a job classification plan relate to one's salary check? Undoubtedly, one frequently hears the slogan, "Equal pay for equal work" as a management goal. Like many other slogans, it is simpler to understand than to achieve. The establishment of a sound, job classification plan is the first long step toward achieving equal pay for equal work. Let us discuss some basic features of a good pay plan without any reference to the job classification plan, and then come back and tie the two together.

In its simplest form, the anatomy of a pay plan consists of series of pay ranges that are sufficiently numerous to embrace all the different positions in the

organization from top to bottom. Each of these pay ranges has:

A minimum or "starting" rate for each pay range;
A maximum or "top" rate for each range; and
Several intermediate steps between the minimum and maximum rate in each range to provide a basis for recognizing the employee's increased proficiency and worth in his work.

While no two pay plans are exactly alike in all these respects, certain general principles are usually reflected in their structure. For example, it is regarded as sound practice to provide a "spread" of approximately 25 per cent between the minimum and the maximum pay rate in a particular range. This can be subdivided into three, four, five, or more intermediate steps.

Factors in Setting Pay

When a pay plan is being developed for a public agency, there are three important factors that have a bearing on the final product. These three factors are:

The relative level of duties and responsibilities of the jobs within the pay plan.
The rates paid elsewhere for similar work.
The extent to which the financial resources of the public jurisdiction enables it to meet competition for talent.

No realistic approach to setting pay rates for public employees can afford to ignore any one of these three factors, although there are times when pressures arise to minimize or disregard them. Unlike a private business concern, which can pay any salaries it desires as long as it continues to show a profit and keep the stockholders satisfied, a public jurisdiction has far less leeway when it comes to setting salaries. But even so, an orderly and systematic approach to setting up a pay plan will eliminate many inequities that would otherwise creep in.

We have already seen how a job classification plan can provide a sound basis for a pay plan by grouping like positions together for compensation purposes. Let us now consider for a moment the second of the factors I have just mentioned—the rates paid elsewhere for similar work. It is right at this point that confusion and misunderstanding can arise unless great care is exercised. Before the pay plan is set up, it is highly desirable to gather information about rates paid for similar jobs elsewhere.

In this case, "elsewhere" is a loaded word. Someone has to decide how widely it is necessary to seek "elsewhere" for that information. Should the survey cover the local community only; should it extend to surrounding state or states; or should it blanket the country as a whole? But no matter what the scope of the pay survey may be, it is necessary to set up safeguards to be sure that the pay rates being quoted are actually for comparable jobs—not just for jobs that have similar sounding titles. Anyone who has had the experience of studying pay schedules from several different public health agencies quickly notes how they vary and how many different job titles there are in the occupational nomenclature of the public health profession. When the personnel office makes a survey of salaries paid elsewhere, it must be sure that the jobs for which pay information is sought are adequately described, and that the pay rates gathered elsewhere are really for jobs that are similar in scope and level of duties and in required training and experience.

Getting Comparable Data

Similarly, it is necessary to decide in advance where to turn to get information about jobs that are similar to those in one's own organization. There are marked regional differences in the general level of pay rates among various broad areas of the country—differences that are deeply rooted in the economic

levels of these areas. For example, if we were to compare pay rates for Public Health Veterinarian I in New York, California, Wyoming, Arkansas, Ohio, and Oregon they would spread over quite a range. It would not help much merely to average them all and say "We'll pay the average rate for Public Health Veterinarians in our state."

For the purposes of this short discussion it is not practical to go deeply into the details of the best way to get pay information from other localities as a step toward setting up a pay plan. Suffice to say that it takes specialized skill and know-how, and is not recommended as a project for amateurs.

Tying Classification and Pay Together

To get on with our story—let us assume that the personnel office has screened and analyzed all the pay information it has gathered from elsewhere, and that all the jobs in the organization have been properly classified. There still remains the crucial step of fitting the parts all together into a coherent whole that makes practical sense. The personnel office will probably develop a first draft of the pay plan and fit the various job classes into the pay ranges that appear to be most appropriate from the data at hand. Here, again, informed judgment of experienced personnel people comes into play, as well as other extraneous factors that must be taken into account.

One of these extraneous but pertinent factors is the fact that rates of pay for elected and appointed public officials are often spelled out in the law, and these laws are not always in step with current economic trends. If the law in a particular state specifies the salaries of top public officials in terms of 1939 dollars, one can readily see what an influence this will have on the over-all level of pay rates for that entire state service. The remedy here, of course, is to remove the pay setting function from the statutory realm, and let it be more responsive to the economic trends of the times and the locality.

But let us say that the state has no artificial ceilings on pay levels for its employees. There still remains the problem of bringing the over-all pay plan into line with the financial resources of that state. Suppose the personnel office has done a careful job of gathering pay data and has developed a preliminary draft of an over-all pay plan. The next question is: "What does all this add up to in terms of budget?"

If it adds up to one or two million dollars more than the most optimistic estimates of current state revenues, something has to be done here and there along the line to trim the pay plan down to a financially feasible level. Sometimes the scaled-down adjustments give rise to employee dissatisfaction. Sometimes the adjustments involve increases in the tax rate—and this does not bring applause from the tax-paying public. But whoever is left unsatisfied by the ultimate form of the pay plan, the fact remains that it must take into account the ability to pay.

Much more could be said about the process of classifying positions and setting pay rates, but it is not possible here to treat the subject in depth or detail. What I have attempted to do is to present a condensed, dehydrated version of the series of steps that begins with a job description and ends with a pay check. I have purposely endeavored to treat the subject in general terms, rather than confining the discussion solely to specific professional positions.

Mr. Donovan is managing editor, Public Personnel Review, Chicago, Ill.

Adapted from a paper presented at the Institute on Veterinary Public Health Practice. Sponsored by the University of Michigan School of Public Health, Ann Arbor, Mich., October 9, 1958.

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Journal of Public Health

EDITORIALS

Virology on the Bookshelf

The April issue of the Journal is known to its readers as the annual book number. For more than a decade the lead article in it has offered an overview of the basic and significant literature in one or the other fields with which the professional groups in public health are concerned. Among these have been epidemiology, health education, evaluation, public health administration, international health, social science, and others. For the most part these Bookshelf articles have tended to concentrate on the more established aspects of the particular field. Some are essentially annotated bibliographies. There is little doubt that these have been useful to our readers as evidenced by the demand for reprints.

This year, in keeping with our desire to make the Journal as useful as possible to our readers, we are altering and expanding the annual Bookshelf. As a variant of the existing pattern, the lead article in this issue is devoted to a review of recent developments in the use of tissue culture technics to diagnostic virology in the public health laboratory. The material of importance in this rapidly developing field is to be found essentially in the periodical literature, and Drs. Schmidt and Lennette have concentrated their review in this direction.

From time to time we shall endeavor to offer reviews of developments in new or older fields of interest to those concerned with the public health. Today we commend to our readers a timely review of what is happening in one aspect of diagnostic virology.

Congenital Malformations—The Problem and the Task

In an essay called "The Vision of Mirzah," Joseph Addison describes how a spirit takes him up to a high place. From this point the course of human life is revealed to him as a bridge over which people pass, and he is asked to observe it.

"Upon a more leisurely survey of it, I found that it consisted of three score and ten entire arches, with several broken arches, which added to those that were entire, made up the number about an hundred. . . . As I looked more attentively, I saw several of the passengers dropping through the bridge, into the great tide that flowed underneath it; and upon further examination, perceived there were innumerable trap doors that lay concealed in the bridge, which the passengers no sooner trod upon, but they fell through them into the tide and immediately disappeared.

These hidden pitfalls were set very thick at the entrance of the bridge, so that throngs of people no sooner broke through the cloud (which shrouded it), than many fell into them. They grew thinner towards the middle, but multiplied and lay closer together towards the end of the arches that were entire."

Today many of these trap doors have been closed as a result of public health action. The diseases of infancy, youth, and early adulthood have been reduced and controlled to such an extent that a whole set of new problems involving old people have appeared. Yet much unfinished business remains at the entrance to the bridge which still lies in clouded obscurity. Prominent among the unsolved health problems in this area are perinatal mortality and certain handicapping conditions, chiefly convulsive disorders, cerebral palsy, and mental retardation which appear to be associated with conditions and circumstances affecting fetal development and birth.

Linked to these is the problem of congenital malformations. A panoramic analysis of this problem and the task it poses was presented by Dr. George W. Corner[1] at the opening ceremonies of the First International Conference on Congenital Malformations, sponsored by the National Foundation, and held in London, July 18-22, 1960. Dr. Corner emphasized that the campaign to understand the nature of congenital malformations "must begin with the study of developmental biology, for we have hardly begun to understand the forces and reactions that drive and guide the development of a fertilized ovum into a human infant. Embryology of the classical morphological type, experimental embryology, cytology, histochemistry, all have their contribution to make. The genes, and the whole sequence of events by which they determine the infinite detail of bodily structure, await new discoveries. There are countless unsolved questions in the physiology of reproduction, touching on the maternal environment of the embryo and its control by hormones and other chemical agents of the body. The chemistry of respiration and nutrition must be called upon to explain the marvelous homeostatic balances through which, after all, the child generally enters the world sound and healthy. Microbiology must detect for us all the various pathogenic organisms which can invade and damage the fetus in utero; clinical medicine and obstetrics must teach us what illnesses of the mother may affect her offspring in the susceptible earliest days of its development.

"Shall we have to call also upon the psychologists and the psychiatrists? Are there mental causes of intrauterine disturbance? Once I would not even have raised such a question before fellow scientists . . . but, after all, the mother's state of mind can affect her body's chemistry and alter her nutritional state. . . . Whether the human mother's emotional upsets and alarms can disturb the environment of the embryo in utero sufficiently to produce physical anomalies I would on the whole still doubt, yet the question cannot at present be excluded from our wide-ranging inquiries."

Dr. Corner's statement is one to be read in its entirety, for to the public health workers it poses a challenge. Research leads to new knowledge, some of which will undoubtedly lead to application in the community. We must be prepared to do so. This is one of the frontiers of public health, and while much research will undoubtedly be carried on in laboratories, there is a great deal that can be done through population studies in the community. Are we prepared to meet the challenge?

1. Corner, George W. Congenital Malformations. The Problem and the Task. The National Foundation, 800 Second Ave., New York 17, N. Y.

Fluoridation: The Case for Action

EARLY in January, 1960, Hartford, Conn., began to fluoridate its water supply. This achievement was the result of an educational, organizational and administrative process carried on since 1951. Early this year, however, six antifluoridation bills were thrown into the hopper of the Connecticut Legislative Assembly. If passed, they would undo the work that had been done in Hartford, and make it difficult if not impossible to achieve this important public health goal.

The fact is that opposition to fluoridation of community water supplies continues unabated despite the accumulating scientific evidence. In 1960, for instance, 40 communities voted down fluoridation in contrast to only about a dozen that adopted the practice. Furthermore, even communities that have adopted fluoridation cannot relax and rest on their laurels. Opponents have tried, and in some cases with success, to stop the fluoridation of community water supplies.

Opposition is not limited to any part of the country. Last year, fluoridation was defeated in towns and counties in California (including Sacramento), Illinois, Kentucky, Michigan (Saginaw), Minnesota, Missouri (Joplin), New Jersey, Ohio (Cincinnati), Oregon, Pennsylvania, and Wisconsin. While smaller communities are more likely not to have fluoridated water, opposition is not restricted by size. The largest metropolitan community in the United States has still not taken the necessary action to improve the dental health of its children by providing fluoridated water for them.

The usual reaction of the professional groups concerned with this problem has been to emphasize the need for greater educational efforts. While no one would deny that public education is necessary, the fact is that those who oppose fluoridation, who make a great deal of noise, and who convert a public health measure into a political issue, are immune to education. To paraphrase the Commission on the Survey of Dentistry in the United States, the opponents of fluoridation are totally unimpressed by the scientific arguments advanced in its behalf; for them fluoridation is "dangerous, immoral, unconstitutional, or unscriptural."

Furthermore, a variety of studies concerned with opposition to fluoridation have indicated that to label the opponents antiscientific or uninformed zealots is to overly simplify the situation. Knowledge, values, attitudes toward science, ideological issues, personality characteristics and attitudes to political authority—all are involved in this problem. Opponents of fluoridation undoubtedly include a number of persons whose normally quiescent fears and insecurities are aroused by the manner in which they are confronted by the issue. It is probably no accident that among the opponents of fluoridation are persons who oppose other health measures. In this sense, antifluoridation is simply the most extreme aspect of a problem that is endemic in many communities. Today the object of opposition is fluoridation. Tomorrow it may be legislation affecting mental health services (this was already evident in Congressional hearings over the Alaskan Mental Health Bill), or some other form of public health activity.

From all accounts of fluoridation controversies, despite any disparities in them, it is clear that the problem is a political one. Within this context it may be useful to help governmental units and health agencies to see whether the fluoridation issue cannot be dealt with by administrative action. Where a referendum is required, proponents of fluoridation must prepare carefully and methodically. Furthermore, other conditions must be favorable or at least

neutral. Where there is public dissatisfaction with governmental services, this feeling may be used by opponents of fluoridation to gain support on their behalf. Some social scientists, notably Paul and his colleagues at the Harvard University School of Public Health, are engaged in unraveling the factors and the processes involved in acceptance or rejection of fluoridation. Their findings have already begun to elucidate some facets of the problem and will undoubtedly throw more light on the matter as the results of these studies accumulate.

But what of the here and now? Certainly sustained educational campaigns carried on by public health, dental, and medical organizations are necessary. Education is a long-term process and the results are not immediately evident. More significant, however, is the need for a central organization or agency to provide consultation and field assistance to communities interested in fluoridating their water supplies, or to those beset by opponents of fluoridation. A suggestion in this sense has been made by the Survey of Dentistry in the United States, and all those concerned with this matter must consider the creation of a voluntary agency for dental health and related problems. Making use of the skills of administrators, social scientists, educators and other relevant persons, analysis of a community might be carried out in advance to locate existing sources of possible opposition, to determine neutral elements and to see how they might be involved in favor of fluoridation, to help plan effective educational activities, and other related needs.

Last but not least—On various ceremonial occasions we express our filial piety for our public health ancestors, but we seemingly forget that we can also learn from them. Lemuel Shattuck, Stephen Smith, Dorman B. Eaton, and the others did not shrink from the political arena when necessary. They were not afraid to stand up and be counted, and they called a spade a spade. Certainly we can do no less today. What a particular community needs, what action it requires, must be decided locally. But public health people have a definite responsibility for leadership, for education, and to see to it that the welfare of the majority is recognized. This is the responsibility of the health officer, the sanitary engineer, the public health nurse as well as of the public health dentist.

Resolutions (such as the strong stand taken recently by APHA) passed at annual meetings are helpful, but they become meaningful only as they are translated into action in the field. Now is the time for action.

COMMITTEE ON AFFILIATED SOCIETIES AND REGIONAL BRANCHES

THIS REPORT marks the completion of my first year as chairman of this APHA Standing Committee. It is a report of progress made during the year, thanks to the work done or begun under the leadership of my predecessors, Drs. Malcolm Merrill and Harold Erickson.

The committee sponsored the third annual "get-together" of representatives of Affiliated Societies and Branches at Atlantic City in which 49 persons, representing 35 affiliates, participated. The group concerned itself with two major topics: Legislation and Membership.

Role of Affiliated Societies and Branches in Matters of Policy and Legislation

The chairman of the Committee on Public Policy and Legislation, Clarence Klassen, stated that his committee looked to the Affiliated Societies and Branches for guidance in establishing policies. Definite liaison must be established and maintained between APHA and its affiliates in order to support effectively state and nation-wide legislation.

It was recommended that each society and branch appoint a contact person to work with the APHA in Washington, D. C. The intent of the legislative communications emanating from the Washington office is to alert and inform the affiliates as to what bill is before one of the governmental bodies so that appropriate state and local action may be quickly forthcoming.

The representatives of Affiliated Societies and Branches requested several items from the Committee on Public Policy and Legislation that they thought would help their associations fulfill this role effectively:

The desirable characteristics and other criteria for the proper contact person should be determined

There should be an APHA policy manual

Brief pros and cons of the bills being acted upon should be included in the legislative communications

Those communications should not have "Restricted Circulation."

These recommendations have been submitted to the Committee on Public Policy and Legislation.

Membership Matters

Frequent mention of membership will be made throughout this report. The effects on membership promotion of the joint billing experiments were discussed during Atlantic City's "get-together." The first year proved fruitful in terms of new members for both the state association and the APHA. Pennsylvania gained 107 new members the first year, 35 in the second year. Forty members joined APHA the first year, ten the second year. There are many other considerations involved in joint billing and this committee has agreed to give the whole subject further study.

Several suggestions for promoting membership in state, regional, and national associations were offered at this "get-together" and will continue to be scrutinized by the members of this committee.

Results of Survey Published

Still in the area of membership, your attention is invited to the published results of a survey conducted by the Com-

mittee on Affiliated Societies and Regional Branches (A.J.P.H. Aug., 1960, pp. 1206-1216). Reprints are available from the Administrative Office.

The purpose of the survey was to assist the committee in answering some questions, such as, why people did or did not join the APHA and their state associations, questions on Annual Meeting attendance, and Journal readership. Each of you is urged to study it.

The results of this survey prompted this committee to submit a resolution on "Strengthening Professional Public Health Associations." This recommended that the American Public Health Association urge all health administrators to promote membership of their staff members in professional public health associations at all levels and urged health administrators to encourage and assist their staff members to participate actively in these associations. (The Governing Council adopted this resolution. It is printed in full in the January, 1961, issue of the Journal.)

Committee's Spring Meeting

The Committee on Affiliated Societies and Regional Branches met in Memphis, Tenn., April 13-15, 1960, at the time of the Annual Meeting of the Southern Branch, APHA. In addition to holding its own interim meeting, the committee appeared as the panel for the opening general session of the Southern Branch meeting program; the theme being "Progress Through Affiliation."

Discussion during meetings centered on the establishment of a regional office for the Southern Branch. This Branch requested financial support (in the amount of $200) from each of the 16 state associations in its area. The Branch also asked for an emergency APHA grant of $2,500 to help support the office. The CASRB recommended approval by the APHA Executive Board if APHA's financial condition permitted.

Recommendations Before Committee on Constitution and By-Laws

The present By-laws stipulate that both new and existing Affiliated Societies shall maintain on their membership rosters a minimum of 75 per cent of the APHA Members and Fellows in their areas. This requirement has been reviewed and studied by this committee, the Governing Council, and the Committee on Eligibility. The Committee on Affiliated Societies and Regional Branches has, as a result of these deliberations, made the following recommendation:

That the 75 per cent membership requirement be deleted entirely from Article IV, Section I, of the By-laws and that no stipulated requirement be written into the By-laws; that each affiliate constantly work toward 100 per cent APHA participation; that the Affiliated Societies are to be reminded each year that this is the aim of the committee and the Association; that the societies and the committee are to continue to work together toward this goal and report progress periodically in the form of tabulations or map of figures.

The second change in the By-laws concerns clarification of Article VI, Dues, Section 6, which now reads:

"The dues for Affiliated Societies shall be one per cent of their gross annual income, provided that the minimum dues per society shall be $10.00 per year . . ."

It is recommended that this article be interpreted as follows:

The Affiliated Societies should continue to pay annual dues as stipulated in Article VI, Section 6, of the By-laws, but the dues should be based on 1 per cent of the income from their membership dues only. The $10 minimum is to continue to apply.

Western Regional Office

The joint Western Branch, APHA, and APHA Western Regional Office in San Francisco has busied itself this year with the following activities: Assist-

ing Affiliated Societies in annual meeting programs, providing secretarial assistance, arranging for teams of speakers and making plans for a second series of Institutes on Association Management.

The director of the regional office has attended most of the annual meetings in the Western Branch area, has met with numerous officers for executive meetings, and participated in the Western Branch Regional Migratory Labor Conference in Phoenix this year.

Under the joint auspices of the University of California School of Public Health and the Western Branch-Western Regional Office, two continuing education courses have gotten under way. The program is staffed by a full-time educational director whose responsibility is to work in the field with local planning groups in setting up educational programs.

The Western Regional Office, in serving as the Executive Office of the Western Branch, has worked with the planners of Western Branch's annual meeting for this year and for next year in San Diego, which is to be a joint meeting with the U. S.-Mexico Border Public Health Association. The staff has been involved in administrative duties, meetings with Western Branch officers, and has produced four issues of "Western Public Health" under the direction of the Western Branch Publications Committee.

Part of the plans for the future is the development of relationships with other organizations, such as the Council of State Governments and the Western Interstate Commission on Higher Education.

Institutes on Association Management

It was on the recommendation of this committee that the Institutes on Association Management were extended beyond the Western Branch area. Three such workshops took place this year in the Southern states, involving 33 participants, as follows:

Louisville, Ky.— January 25 and 26, 1960
Kentucky, Indiana, and West Virginia Public Health Associations

Atlanta, Ga.—January 28 and 29, 1960
Florida, Georgia, North Carolina, and South Carolina Public Health Associations

Memphis, Tenn.—April 12, 1960
Arkansas, Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, and Texas Public Health Associations and Southern Branch.

Proceedings of these institutes and of the ones held in the Western Branch area are being prepared now. More institutes are being planned for the near future.

Staff Visits

In addition to the number of meetings covered by the director of the Western Regional Office, five APHA staff members have attended a total of 30 state and branch meetings this year. Incidentally, reports on the meetings and activities of Affiliated Societies and Branches have occupied 67 pages of the Journal this year, as compared with 47 pages in the previous year.

We wish to urge each of you to study carefully the "Report of an Inquiry on Members and Nonmembers" in the August, 1960, Journal, referred to previously. It may stimulate helpful discussion based on answers to the survey question on why members of the affiliates do not belong to APHA. For example, although the population and membership concentration are in the East, are we justified in meeting in the western half of the United States only six times in 50 years, as shown in the listing in the March, 1960, Journal? Do we provide awards and recognition equitably among those who invest the most in time, effort, and expense in long trips to our APHA meetings, or do these go mainly to those for whom we have made participation and meeting attendance easiest? Twelve of the last 25 meetings were held in or

within 325 miles of New York City. Interest in and support of APHA grows by what it feeds upon, and this includes accessibility of APHA Annual Meetings. Also, in what ways should affiliates encourage states without public health associations to establish such and affiliate with APHA?

We know from personal experience that attending or missing an annual meeting influences our plans for the following year.

Might a regular pattern of rotation be worth trying which would make APHA meetings more accessible to a majority of the membership? For instance, meetings could be held in successive years in the East, Central (to APHA membership), West, Central, and East. Enjoyment of one meeting is encouragement to go farther next year to keep up the continuity in anticipation of a more attainable meeting if it comes soon and not nine years away. This continuity might have an effect on the pattern of attendance that has been true consistently over the years—of the paid registrants, members and nonmembers of the APHA are about equal in numbers.

Your Committee on Affiliated Societies and Regional Branches solicits suggestions from throughout APHA on matters which we should study and toward which adjustment is desirable in these changing times.

J. W. R. NORTON, M.D.
Chairman

Dr. Norton is secretary and state health officer, State Board of Health, Raleigh, N. C.

Report of the chairman of the Committee on Affiliated Societies and Regional Branches to the Governing Council at the Eighty-Eighth Annual Meeting of the American Public Health Association in San Francisco, Calif., October 30, 1960.

Comeback of Professional Schools in Chile

With schedule adjustments that will permit a full academic year for the students, the schools of medicine, dentistry, and nursing of the University of Concepción in Chile are back to as near normal an operation as possible under the circumstances.

In the earthquake of May 21, 1960, medical school buildings suffered only minor damage, but nearly $100,000 of equipment was broken when thrown to the floor or against walls. The dental school building was so badly damaged that it was condemned as unsafe; its new building is to be constructed near the medical school and teaching hospital. The building that housed the school of nursing will also have to be replaced.

The university is receiving aid from many countries to help it replace equipment. Among United States donors is the W. W. Kellogg Foundation which has contributed $100,000. The Chilean government will help meet the costs of the new construction that is necessary.

RESPONSE TO MULTIPLE ANTIGENS

Epidemiology Section

DURING 1960, the Multiple Antigens Committee, Epidemiology Section of the American Public Health Association, completed a study on "The Antigenic Response to a Booster Injection of a Multiple Antigen Preparation Containing Pertussis Vaccine, Diphtheria Toxoid and Tetanus Toxoid Given Seven Years or More After Primary Immunization." The study, which is being prepared for publication, suggests that it may be unnecessary to administer routine booster injections as frequently as every three to four years.

The committee unanimously passed the following resolution with the recommendation that it be published at the earliest possible moment.

"The Multiple Antigen Committee, Epidemiology Section of the American Public Health Association, has taken note of the accumulating evidence that responses to injected polio antigen are inadequate in a significant percentage of infants whose immunization is begun below three months of age. These findings appear to be closely related to the presence of maternal antibodies in high titer which is a direct result of the now widespread practice of immunization of a pregnant woman. Therefore, this Committee recommends that polio immunization by injection not be routinely initiated below three months of age."

The recommendation presented above is not applicable to the use of live poliomyelitis vaccine, which presents different biological and immunological problems and which is now being actively studied by several groups of investigators.

The committee has several additional studies under way evaluating the use of multiple antigens. These will be reported on as they approach publication.

WILLIAM E. BUNNEY, Ph.D., Chairman, Multiple Antigen Committee

H. D. ANDERSON, Ph.D.
GORDON C. BROWN, Sc.D.
GRACE ELDERING, Sc.D.
RUSSELL GOTTSHALL, Ph.D.
PEARL L. KENDRICK, Sc.D.
ALEXANDER D. LANGMUIR, M.D.
RODERICK MURRAY, M.D.
R. E. SERFLING, Ph.D.
FRANKLIN H. TOP, M.D.
V. K. VOLK, M.D.
ROBERT WILSON, M.D.

Dr. Bunney is associated with E. R. Squibb and Sons, New Brunswick, N. J.

This report of the chairman was presented before the Epidemiology Section Council, American Public Health Association, at the Eighty-Eighth Annual Meeting in San Francisco, Calif., October 31, 1960.

Two Reasons for Title Change

The Philadelphia Department of Public Health is composed of the Philadelphia General Hospital, the Office of the Medical Examiner, and a division formerly known as Public Health Services, but now called Community Health Services. According to Eugene A. Gillis, M.D., health commissioner, the new title not only is a "more descriptive name for the Department's component whose function is to preserve and improve the health of the entire community" but also may help remove public confusion over the similarity in name of the Department of Public Health, the U. S. Public Health Service, and the former designation—Public Health Services.

COMMERCIAL STAPHYLOCOCCAL TYPING PHAGES

Laboratory Section

THE Committee on Staphylococcal Phage Typing of the Laboratory Section of the American Public Health Association has been concerned with problems posed by the commercial marketing of staphylococcal typing phages. The committee reaffirms its position set forth in a previous publication.[1]

Recognizing that there is no official or semiofficial body with legal authority to regulate or control the commercial preparation and distribution of staphylococcal typing phages, the committee has drawn up recommendations for the guidance of firms currently marketing or planning to market such phages. It is our sincere hope that these firms will voluntarily accept the recommendations and abide by them conscientiously. Further, we recommend to prospective users of commercial typing phages that they use these recommendations as a guide in determining the suitability of phages purchased by them as judged by application of procedures approved by the International Committee on Phage Typing of Staphylococci.[2]

The recommendations for the guidance of commercial suppliers follow:

1. Each batch of each staphylococcal typing phage prepared for distribution shall be propagated from standard phage on its homologous propagating strain, both to be obtained solely from the International Staphylococcus Reference Laboratory, Central Public Health Laboratory, Colindale Ave., London, N.W. 9, England.

2. Standard phages from the above source shall not be repropagated before use as seed for batches of typing phages except when unavoidable. Such repropagation shall then be permissible only when necessary to enhance potency or to prepare a larger volume of seed phage than that furnished by the International Reference Laboratory. In all cases, repropagation shall be held to a minimum. Once repropagated from standard phage, no seed phage shall be used unless it conforms to the lytic spectrum recognized for it by the International Committee. Once a suitable seed phage has been achieved, it shall not be further repropagated for the same purpose.

3. Propagating strains of staphylococci used in batch production shall be subjected to not more than one transfer between receipt from the source specified and seeding of a batch under preparation.

4. A potency of 1,000 RTD (routine test dilution) shall be the minimum acceptable titer of each typing phage at the time it is delivered to the user.

5. A viable subculture of the homologous propagating strain shall be supplied along with each typing phage preparation. Such subculture shall be not more than one transfer removed from the standard culture received from the source specified. It shall be made clear by the supplier that these cultures are furnished so that the receiving laboratory may carry out its responsibility for determining the RTD and for checking the potency of each phage at RTD in the routine typing runs.

6. All literature, instructions, and written procedures distributed by suppliers shall be compatible with recommendations and approved procedures of the International Committee on Phage Typing of Staphylococci.

The following statement of "Recommended Procedures for Phage Typing of Staphylococci" was prepared by John E. Blair, Ph.D., chairman, International Committee on Phage Typing of Staphylococci. Although this is not an APHA committee, the content relates so closely to the report of the committee that it is published here for the general interest of Journal readers.

REFERENCES

1. Committee on Staphylococcal Phage Typing. Letter to the Editor. A.J.P.H. 49:1192, 1959. (Procurable together with "Statement on Availability and Uses of Staphylococcal Phage Typing" through Book Service, American Public Health Association, 1790 Broadway, New York 19, N. Y.; 25 cents a copy.)
2. Blair, John E. and Williams, R.E.O. Bull. World Health Organ. (In press.)

EARLE K. BORMAN, M.S., Chairman, Committee on Staphylococcal Phage Typing

JOHN E. BLAIR, Ph.D.
HOWARD L. BODILY, Ph.D.
ALCOR S. BROWNE, Ph.D.

Evan T. Bynoe, Ph.D.
Jean-Marc Desranleau
Valerie Hurst, Ph.D.
George Gee Jackson, M.D.
Vernon Knight, M.D.
Marie Mulhern
Elaine L. Updyke, Sc.D.
Robert I. Wise, M.D.

Mr. Borman is associated with the State Department of Health, Laboratory Division, Hartford, Conn.

RECOMMENDED PROCEDURES FOR PHAGE TYPING OF STAPHYLOCOCCI

The wide use of phage typing for the characterization of staphylococci makes it highly desirable that all laboratories employ those reagents and procedures that have been found to be the most acceptable, so that there may be a common basis for the intelligent comparison of the results of phage typing. Of special importance are the control methods used to determine the suitability of the phages for typing.

In behalf of the International Committee on Phage Typing of Staphylococci a statement has been prepared which embodies the recommended procedures and is based upon the combined experience of many investigators in the field. The statement was prepared by Dr. John E. Blair, chairman of the committee, and Dr. R. E. O. Williams, secretary, with the collaboration of Drs. Elizabeth H. Asheshov, M. Patricia Jevons, and Elaine L. Updyke. It has received the approval of the committee and has been submitted for publication in the Bulletin of the World Health Organization.

This statement describes in some detail the methods used to propagate the phages, to determine the routine test dilutions and lytic spectra of the phages, and to type cultures of staphylococci. Those procedures that are regarded as essential are indicated and the limits of any permissible deviations are pointed out. The sometimes perplexing problems of interpretation of phage typing results also are discussed.

The very nature of phage typing, which involves the often complex interactions between two living entities, demands the most careful control of the reagents and of each step in the procedures. This principle applies whether the phages are prepared in small volume by the individual laboratory or in bulk by a central distributing laboratory or by a commercial producer. It is hoped that the statement described above will provide a useful guide to all who prepare and use the staphylococcal typing phages. The reliability and reproducibility of phage typing procedures and the interlaboratory comparability of results will be assured only when all laboratories utilize these control methods at all times.

Dr. Blair is head of the Department of Bacteriology, Laboratory Division, Hospital for Joint Diseases, New York, N. Y.

ASSOCIATION NEWS

APHA EIGHTY-NINTH ANNUAL MEETING

Detroit, Michigan

November 13-17, 1961

Errata—11th Edition of Standard Methods for the Examination of Water and Wastewater

Following are corrections that have been incorporated in the second printing of the 11th Edition, "Standard Methods for the Examination of Water and Wastewater." Purchasers of the first printing should make appropriate corrections in their copies.

1. Page ix—Right-hand column of the WPCF committee list. It should be R. D. Pomeroy.
2. Page xiii—"Contents." Under "Phenols," change subcaption to read: "Preliminary Distillation Procedure."
3. Page 11—Left column, replace the 6th to 3rd lines from the bottom with: "the necessary correction can be made by adding the color developing reagents to distilled water and nulling the photometer with the resulting solution."
4. Page 12—Left column, 5th line, delete "a zero blank standard" and substitute, "distilled water," so that the line reads, "through distilled water, while."
5. Page 12—Left column, next to last line of Sec. 7, insert, "flocculating or" after "any," so that line reads: "any flocculating or filtering procedure and an attend . . .".
6. Page 66—Sec. 4.1, 2nd line. Change "100" to "50."
7. Page 108—Sec. 3.2, 2nd line. Change "1, 5-diphenylcarbazide," to "1, 5-diphenylcarbohydrazide." (When a numerical prefix is attached, "diphenylcarbazide" should properly be "diphenylcarbohydrazide"; this chemical may also be referred to as "s-diphenylcarbazide.")
8. Page 147—The second paragraph under "Lead," should be amended to read: "The method outlined below for the determination of lead is applicable to potable waters. An additional colorimetric method for lead in sewage and industrial wastewater is described in Part III, Metals (Heavy), Method F (Lead)."
9. Page 161—Sec. 4.1, the 8th and 4th lines from the bottom of the page. Change "meter" to "needle" in each case.
10. Page 171—Sec. 4.4. Change the last sentence to read: "Lower the collected distillate free of contact with the delivery tube, and continue distillation during the last minute or two to cleanse the condenser."
11. Page 174—Sec. 2.2. Delete "or KOH."
12. Page 174—Left column, 3rd line in par. 2.3.b, replace the present chemical symbol, "$KNa_4H_40_6$" with "$KNaC_4H_4O_6$."
13. Page 184—Sec. 4.3. Revise the last sentence to read the same as in "10" above.

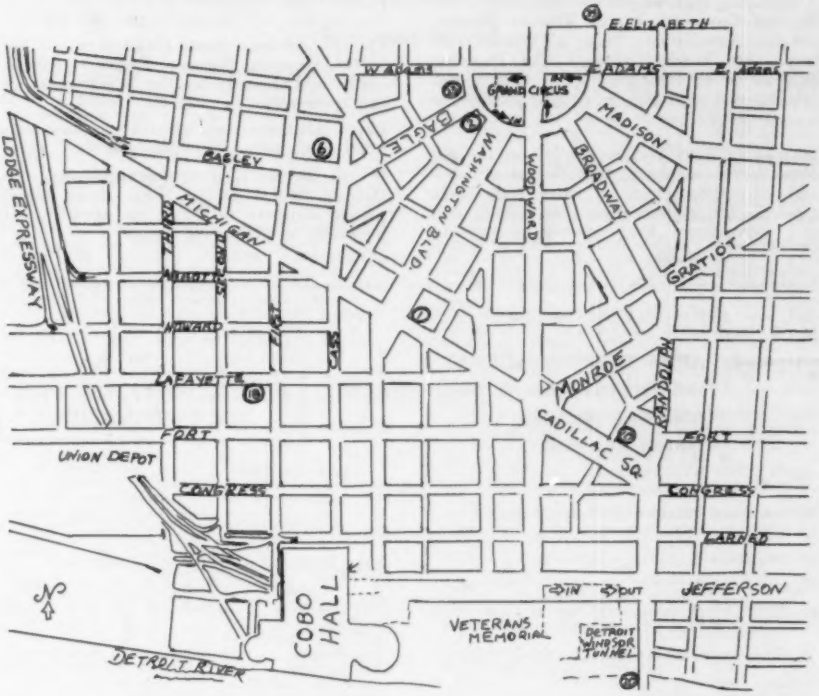
14. Page 197—"Phenols." Revise the title to read, "Preliminary Distillation Procedures."
15. Page 205—Sec. 4.2, 3rd line. Change "10" to "25."
16. Page 284—Sec. 3.2, 15th line. Change the quantity, "3.250" to "3.249."
17. Page 368—Sec. 3.12, 2nd line. Change "1,5-diphenylcarbazide" to "1,5-diphenylcarbohydrazide."
18. Page 397—Left column, par. 2.1, change "140" to "125." At the end of that sentence (second line of par. 2.1) place an asterisk (*). The corresponding footnote should read: "*American Instrument Co., Cat. No. 5-226 or equal."
19. Page 397—In the fourth line of Sec. 2.2, the asterisk should be changed to a dagger (†); consequently, in the footnote at the bottom of the page, the asterisk should be changed to a dagger.
20. Page 503—Third column from right, the first line in the 6th group of 5 lines (this refers to the number of positive tubes shown under column "B" as 4, 3, 1), change the "22" to "33."

Stress and its Headstrong Offspring

"It is so easy to bequeath an all-embracing word upon a wide variety of things and thus convince oneself that they all resemble each other closely. Are we not guilty of much the same thing if we use the word 'stress' to embrace all the thousand natural shocks the flesh is heir to? The same word stress is applied to the deliberate crushing or burning of a limb in experimental work on anesthetized animals but is also used to cover the strain felt by a financier making money on the stock exchange. It seems likely that the reaction of most of us to having our legs crushed would be very different from our reaction to making money on the stock exchange. Not only has the word 'stress' been allowed to run wild, but its headstrong offspring, the adaptation syndrome, has been given equal freedom to roam anywhere and lay claim to any unexplained illness that comes its way."

(Richard Asher. Making Sense. The Lancet, (Sept. 19), 1959.)

Street Plan of Detroit Showing Location of Cobo Hall and Housing Bureau Hotels (Number indicates location on map.)



HOTELS AND RATES

Index to Map	Hotel	Single	Double	Twin Beds	Parlor Suite
6	Detroit-Leland ..... Cass & Bagley Sts.	$7.50-13.50	$10.50-16.00	$12.00-19.00	$25.00-35.00
10	Henrose ..... Cadillac Square & Bates St.	6.50-10.50	9.00-13.50	12.50-16.00	25.00-45.00
18	Pick-Fort Shelby ..... 525 Lafayette St.	6.00-12.75	9.00-15.50	10.50-16.25	23.00-43.50
20	Prince Edward ..... Windsor, Ontario	6.50- 8.50	9.50-11.50	11.50-12.00	21.00-25.00
1	Sheraton-Cadillac ..... 1114 Washington Blvd.	8.50-18.00	14.35-20.50	14.85-23.00	29.00-37.50
2	Statler-Hilton ..... 1539 Washington Blvd.	7.00-13.50	12.50-17.00	14.00-24.50	29.00-44.00
23	Tuller ..... Park and Adams Sts.	5.00- 9.00	9.00-12.00	10.50-15.00	25.00
25	Wolverine ..... Witherell and Elizabeth Sts.	6.00- 9.00	8.50-10.00	11.00-18.50	25.00

DETROIT ANNUAL MEETING, NOVEMBER 13-17

A Housing Bureau will be operated by the **Detroit Convention and Tourist Bureau** for the Association. Since all requests for rooms are handled through the **Housing Bureau** in chronological order, it is recommended that you send in your application as soon as possible.

In making hotel reservations please use the blank below, indicating four choices of hotels and a specific range in rates from those quoted. All requests must give definite date and approximate hour of arrival and departure and the names and addresses of all persons who will occupy rooms requested.

All reservations must clear through the APHA Housing Bureau. Requests will be confirmed directly by the hotel in which the reservation is placed.

Hotels will hold room reservations only until **6:00 p.m.,** unless otherwise specified.

If you would like accommodations in a Detroit Hotel other than those listed please indicate this and an attempt will be made to place you there.

MAIL TO:

APHA HOUSING BUREAU
Detroit Convention & Tourist Bureau
626 Book Building
Detroit 26, Mich.

PLEASE PRINT OR TYPE ALL INFORMATION

PLEASE MAKE RESERVATIONS NOTED BELOW: (Please indicate rate range.)

First Choice	Single Room .....From $..... to $.....
Second Choice	Double Bedroom .....From $..... to $.....
Third Choice	Twin Bedroom .....From $..... to $.....
Fourth Choice	Parlor/Bedroom Suite..From $..... to $.....

ARRIVAL DATE ....., HOUR.....A.M.....P.M..... DEPARTURE DATE.....

If reservation cannot be made in one of the hotels indicated, shall we place you elsewhere? Yes..... No.....

NAMES OF ALL OCCUPANTS (Please bracket those sharing a room)	ADDRESSES
.....	.....
.....	.....
.....	.....
.....	.....

Confirm reservation to: .....

Address:.....
(Street) (City) (Zone) (State)

NEWS OF AFFILIATED SOCIETIES AND BRANCHES

APHA Affiliated Societies and Branches

Society and Secretary

ALABAMA PUBLIC HEALTH ASSOCIATION, Ralph Roberts, State Health Dept., Montgomery
ARIZONA PUBLIC HEALTH ASSOCIATION, Verona Massey, State Dept. of Public Health, Phoenix
ARKANSAS PUBLIC HEALTH ASSOCIATION, Mrs. Vada Russell, State Health Dept. Bldg., Little Rock
CALIFORNIA, NORTHERN PUBLIC HEALTH ASSOCIATION, Mrs. Jean Davis, City Health Dept., San Jose
CALIFORNIA, SOUTHERN, PUBLIC HEALTH ASSOCIATION, Dorothea Hansen, City Health Dept., Los Angeles 12
COLORADO PUBLIC HEALTH ASSOCIATION, Alice de Bruyn Kops, 4660 S. Delaware, Englewood
CONNECTICUT PUBLIC HEALTH ASSOCIATION, Shirley Thayer, R.N., 61 Arnold Way, West Hartford 7
CUBAN PUBLIC HEALTH SOCIETY, Dr. Raphael Calvo Fonseca, Calle 19 No. 311 Altos Vedado, Havana
FLORIDA PUBLIC HEALTH ASSOCIATION, Everett H. Williams, Jr., P. O. Box 210, Jacksonville
GEORGIA PUBLIC HEALTH ASSOCIATION, Mrs. Martha Power, State Health Dept., Atlanta 3
HAWAII PUBLIC HEALTH ASSOCIATION, Martin Cavitt, 1018 Lunalilo Street, Honolulu
IDAHO PUBLIC HEALTH ASSOCIATION, Ralph Carpenter, 120 N. Capitol Blvd., Boise
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NEVADA PUBLIC HEALTH ASSOCIATION, Mrs. Elaine Walbrook, 101 W. Arroya, Reno
NEW JERSEY PUBLIC HEALTH ASSOCIATION, Waldo McNutt, M.P.H., Delaware River Drive, Frenchtown
NEW MEXICO PUBLIC HEALTH ASSOCIATION, Daniel T. Marley, P. O. Box 8066, Albuquerque
NEW YORK CITY, PUBLIC HEALTH ASSOCIATION OF, Frances Ann McVey, 4317 Robinson St., Flushing 55, N. Y.
NEW YORK STATE PUBLIC HEALTH ASSOCIATION, Carline Millican, Rochester Regional Office, State Health Dept., Rochester
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NORTH DAKOTA PUBLIC HEALTH ASSOCIATION, Alice H. Peterson, M.D., State Dept. of Health, Bismarck
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OREGON PUBLIC HEALTH ASSOCIATION, Muriel David, City Bureau of Health, 203 N.E. 28th Ave., Portland
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SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION, Emily Anne Easterling, Richmond County Health Dept., Columbia
SOUTH DAKOTA PUBLIC HEALTH ASSOCIATION, Alice Brady, R.N., State Dept. of Health, Pierre
TENNESSEE PUBLIC HEALTH ASSOCIATION, C. B. Tucker, M.D., State Dept. of Health, 420 Sixth Ave., N., Nashville
TEXAS PUBLIC HEALTH ASSOCIATION, Joseph N. Murphy, Jr., State Dept. of Health, Austin
UTAH PUBLIC HEALTH ASSOCIATION, Katherine Brandon, M.D., P. O. Box 25, Foothill Station, Salt Lake City
VIRGINIA PUBLIC HEALTH ASSOCIATION, Robert M. Parker, 401 Colley Ave., Norfolk 7
WASHINGTON STATE PUBLIC HEALTH ASSOCIATION, Vance McCallister, 1509 Public Safety Bldg., Seattle 4, Wash.
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION, Mrs. Katherine L. Brown, State Dept. of Health, Charleston 5
WISCONSIN ASSOCIATION FOR PUBLIC HEALTH, Paul Weis, RR No. 2, Waunakee
WYOMING PUBLIC HEALTH ASSOCIATION, Lee Holder, P. O. Box 2203, Cheyenne
MIDDLE STATES BRANCH, APHA, Thelma Luther, Dept. of Health, Des Moines 19, Iowa
SOUTHERN BRANCH, APHA, M. L. McDonald, Dallas Health Museum, Dallas 24, Tex.
WESTERN BRANCH, APHA, Robert G. Beaumier, 1309 Smith Tower, Seattle, Wash.

Wyoming: New But With a History

The Wyoming Public Health Association, one of APHA's new Affiliated Societies, is more a reactivated than a brand new organization. Its seed, sowed in the early Forties, was the State Nutrition Committee of the State Council of Defense. In 1945 this became the State Health and Nutrition Committee. But with a widening scope of interest and base of membership the committee recognized that it was growing into a public health association, and officially organized as such in June, 1949. The first WPHA remained an active group until the middle Fifties. The inactivity which followed was due less to loss of interest than to the loss of key leaders of WPHA through personnel changes.

In 1960 a group favoring WPHA's

reactivation conducted a survey of both professional and lay people in Wyoming to determine the extent of latent interest in the state for reviving the society. Of the respondents the majority said they would like to see the association active again and would themselves share in its work if it were reestablished.

In line with its objective of being an active organization for all people interested in health matters, WPHA has lost no time in coming to the forefront in Wyoming with a contribution to public health. It was joint participant with the Utah and Colorado affiliates in February of the APHA—Western Branch—University of California sponsored Seminar on Cardiovascular Disease at Salt Lake City. WPHA was also able to provide some scholarships for state residents who attended the seminar.

WPHA has planned the Wyoming Health Conference, to be held in May, which will comprise the first annual meeting of the association. The aim is to bring as many agencies and interested persons as possible together to discuss health problems and needs and to recommend action to appropriate agencies.

At last report WPHA had 123 members including persons from industry, official health agencies, voluntary organizations, education, medicine, the military, hospitals, and many private citizens interested in promoting community health.

Hawaii and Pan Pacific Conference

Hawaii Public Health Association turned its annual meeting into a hands-across-the-sea forum in 1960 with the sponsoring assistance of APHA. This took form as the Pan Pacific Public Health Conference held in Honolulu, November 6-7. It immediately followed the 88th Annual Meeting of APHA, allowing two days for travel time. Hawaii had sent 16 delegates to San Francisco (six, courtesy of the Honolulu Chamber of Commerce); the mainland responded with some 100, accounting for a little less than a third of those attending the PPPHC.

At the first of four scientific sessions Alexander Spoehr, Ph.D., D.Sc., director, Bernice P. Bishop Museum, Honolulu, spoke on "Public Health and Anthropology in the Pacific Islands Area." Noting first that in method and outlook "public health and anthropology share certain points which lead to a measure of congeniality between the two disciplines," Dr. Spoehr then spoke of the possibilities for more joint activities in helping the Pacific Islanders achieve better health status. In hinterland areas, for example, modern therapy is fairly readily accepted, but traditional concepts of the causes and nature of disease are very resistant to change. The latter often bar the introduction of practices designed to improve community health. In towns "the need is for assembling basic descriptive data on demography, on geographic, economic and social change, and on the collection of various kinds of statistical information which can serve for effective planning of health services."

At the second session, Berwyn F. Mattison, M.D., executive director, APHA, brought the Association's greetings and presided. Speakers were George V. Moorehead, public health educator, Hawaii Department of Health, who put the state's public health program into historical perspective; E. K. Chung-Hoon, M.D., chief of medical services, Division of Hansen's Disease, Hawaii Department of Health; and E. J. Morgan of Honolulu's Board of Water Supply, who spoke on Oahu's artesian water supply system.

Another session was given over to panels on "Studies to Appraise Our Environment" and "Arteriosclerosis Studies in Hawaii." The former dealt with plague, encephalitis, and—man is

not the culprit here—air pollution during volcanic eruption; the latter was concerned with bovine arteriosclerosis as well as with human atherosclerosis. Both panels drew for their experts on the state health department staff.

The concluding session was a panel on "Looking Ahead in Public Health." This was used as an occasion both for summarizing the presentations at the four sessions and for the presentation of papers. One of these was given by Nils P. Larsen, M.D., medical advisor, Hawaiian Sugar Planters' Association. He exemplified some of the expensive community problems that are widespread enough to make them public health hazards: alcoholism, affecting families and industry; narcotic drug addiction; family planning gaps; environmental health barriers including smog, fall-out, and urban sprawl; problems of old age, including need for encouraging low-rent community housing; and the need for well qualified and experienced personnel and for a critical well informed citizenship.

Other panel members, Herman Hilleboe, M.D., New York, Richard K. C. Lee, host health officer, and Dr. Mattison, discussed the urgency of long-term planning, the development of priorities, the need for research, and the preparation of more personnel. The topics of panelists Dorothy Devereux, R.N., member of Hawaii's House of Representatives, and Richard Voyer, an attorney from Texas, included interpersonal relations, the significance of group judgment in planning, research and operation, and the value of health councils.

Royce Higa, executive secretary, Tuberculosis Association, County of Hawaii, was succeeded as president of HPHA by Leo Bernstein, M.D., M.P.H., deputy director of health, Hawaii Department of Health. Other officers for 1960-1961 are:

Vice-President—George Fernandes

Secretary—Martin B. Covitz, M.P.H., health educator, Hawaii Heart Association, Honolulu

Treasurer—David Bowers, executive director, Tuberculosis and Health Association, Honolulu

APHA Membership Blank on Page XLIX

In Preparation for the 1961 Polio Season

Communicable Disease Center, Atlanta, Ga., will make available in "reasonable number" a new brochure entitled "Babies and Breadwinners." This is the theme for the proposed 1961 Neighborhood Polio Vaccination Campaign which has been based on the recommendations made in January by the Surgeon General's Advisory Committee on Poliomyelitis Control (see page 641, this issue). Surgeon General Luther L. Terry calls it "A community action plan to stimulate vaccinations of infants and young parents, particularly in low-income areas."

EMPLOYMENT SERVICE

The following pages present information for those seeking public health personnel and for those seeking positions in public health. Other information concerning vacancies and personnel available is on file in the Association office. Anyone wishing to have the benefit of this additional information can obtain it by writing to the Vocational Counseling and Placement Service of the Association.

Advertising space in these pages is available at special rates for the use of employers or individuals. The charges are $5 for the first 50 words or fraction thereof and $1 for each additional 10 words or fraction thereof. There is no charge to members or Fellows of the Association who desire to utilize the **Positions Wanted** portion of these pages. **Closing date** for receipt of advertisements is the first of the month preceding the desired month of publication. **All correspondence should be sent to the American Public Health Association, 1790 Broadway, New York 19, N. Y.**

POSITIONS AVAILABLE

Physician—Overseas assignment in Guam to head Maternal and Child Health and Crippled Children's Programs, Public Health Service. Two-year contract with salary from $14,700 to $17,940. Board eligibility in pediatrics or preventive medicine required. Transportation provided at government expense. Furnished quarters at reasonable rates. Delightful tropical living and ideal working conditions. Write to Department of Medical Services, Government of Guam, P. O. Box 428, Agana, Guam.

Institution Medical Services Director—Position with the Hawaii Department of Health. Responsible for the medical, dental, laboratory, and nursing care services in an institution for the mentally retarded. Requires eligibility for certification by the American Board of Pediatrics, Internal Medicine, or Psychiatry and Neurology, and eligibility for a medical license in Hawaii. Salary $10,032-$12,804 per annum. Write to Recruiting and Examining Division, Department of Personnel Services, 825 Mililani St., Honolulu 13, Hawaii.

Local Health Officer—Hammond, Ind. (population 108,000). Well established local health department. Salary $16,000. Prefer person with M.P.H., but will consider someone with public health experience. Valid license to practice medicine in the state of Indiana. Apply to Mrs. Frank M. Kennedy, President, Hammond Board of Health, Hammond Health Department, City Hall, Hammond, Ind.

District Health Officer III—Public health administrator of district area with headquarters in Jefferson City (central) or Macon (north), Mo. Requires Missouri M.D. license or eligibility; seven years' public health medical experience, including three years in an administrative capacity in a broad public health program. M.P.H. may be substituted for two years' experience. Salary $13,000-$16,000. Merit system, vacation, sick leave, retirement, Social Security, travel allowance. Please contact H. M. Hardwicke, M.D., Deputy Director, Division of Health, Jefferson City, Mo.

Assistant Director—City-County Health Department. Requires M.D. degree from an approved medical school, internship, and United States citizenship. Salary $788 per month. Contact N. G. Walker, M.D., M.P.H., Director, Kansas City-Wyandotte County Health Department, 619 Ann Ave., Kansas City, Kans.

District Health Officer II—Public health administrator of district area with headquarters in Jefferson City (central) or Macon (north), Mo. Requires Missouri M.D. license or eligibility and four years' public health medical experience. M.P.H. may be substituted for two years' experience. Salary $11,000-$14,000. Merit system, vacation, sick leave, retirement, Social Security, travel allowance. Please contact H. M. Hardwicke, M.D., Deputy Director, Division of Health, Jefferson City, Mo.

Director of Maternal and Child Health—Plan, direct, and coordinate a state-wide maternal and child health program. Requires Missouri M.D. license or eligibility, certification or eligibility for American Board of Preventive Medicine, seven years' experience in preventive medicine and public health, including three years' experience in a supervisory, administrative, or consultative capacity, and experience in the area of maternal and child health. M.P.H. or one year of approved residency training in pediatrics and/or obstetrics may be substituted for two years' experience, or certification or eligibility for American Board of Pediatrics or Obstetrics and Gynecology and one year of highly responsible experience in preventive medicine in consultative or supervisory capacity. Salary $12,000-$15,000. Merit system, vacation, sick leave, retirement, Social Security, travel allowance. Please contact H. M. Hardwicke, M.D., Deputy Director, Division of Health, Jefferson City, Mo.

Consultant in Occupational Health—Highly responsible medical work of consultative nature in state-wide program of occupational health. Requires Missouri M.D. license or eligibility and six years' experience in industrial medicine in large industrial plant or public health, including three years in supervisory, administrative, or consultative capacity. One year of residency training in internal medicine, surgery, or general practice may be substituted for two years' experience. Salary $12,000-$15,000. Merit system, vacation, sick leave, retirement, Social Security, travel allowance. Please contact H. M. Hardwicke, M.D., Deputy Director, Division of Health, Jefferson City, Mo.

Health Commissioner—County unit, serving 100,000, Hudson River Valley, with headquarters at Kingston, N. Y. This is an established unit with a well trained staff of 50. Experience and training for health officer required, and must be eligible for New York State medical license. Salary $15,000, plus necessary travel. For details, write to Dr. Virgil B. DeWitt, President, Ulster County Board of Health, 15 Main St., Kingston, N. Y.

Commissioner of Health—First County Health Department in New York State needs top-notch public health physician. Population 80,183. Qualifications include M.D., M.P.H., and one year of public health experience. Vacations cumulative to 25 days. Salary open. Write to Mr. B. J. Wilkinson, President, Board of Health, Box 573, Olean, N. Y.

Pediatrician—for State Health Department. To act as pediatric consultant within the agency and work with professional and lay groups in the field. Included in work: hospital standards, school health problems, statistical studies, future program planning. Starting salary $12,240. Ohio medical license, one-year internship, at least two years' graduate training required, preferably Board of Pediatrics or eligible. Civil service position, vacation, sick leave, annual salary increments, and retirement plan. Staff appointment to state university if eligible. Address inquiries to Division of Child Hygiene, Ohio Department of Health, Columbus 15, Ohio.

Assistant Director of Health—This position, which requires an M.D. degree, is open for appointment effective July 1, 1961. Directs health department medical programs, including a large program of tuberculosis sanitarium follow-up, and coordinates many programs for nurses and sanitarians. Heads division of preventable disease control, which has 12 full-time personnel and several physicians on fee for service. Does epidemiology and performs some clinical work, including venereal disease and preemployment examinations. Applicant should have an M.P.H. degree or experience in public health. This is an excellent opportunity for a young man to attain broad experience in a complete public health program which includes well developed mental health services. The Health Department is approved by the American Medical Association for residency training in public health and preventive medicine. This is a metropolitan community of one-third of a million people with modern public offices and equipment. Health Department staff of 90 and budget of $700,000. Starting salary is $10,800 or more, depending on training and experience. Retirement, O.A.S.I., sick leave, vacation, etc. Washington state license to practice medicine is required, or ability to secure license by reciprocity or examination. Write to C. R. Fargher, M.D., M.P.H., Director of Health, Tacoma-Pierce County Health Department, 649 County-City Bldg., Tacoma 2, Wash.

District Health Officer—Public health administrator of a district area; district epidemiologist. Plan, organize, supervise work of professional staff consisting of engineers, nurses, sanitarians, nutritionists, dental hygienists, health educators, and social workers. Requires M.D. and M.P.H. degrees and license to practice medicine in Wisconsin. Salary: Starting rate $1,006, $1,131, or $1,256 per month, depending on training or experience which can be credited toward board certification in public health. Civil service, vacation, sick leave, Social Security, retirement, group health and life insurance benefits, travel allowance. For applications and further information write R. J. Siesen, Personnel Officer, State Board of Health, State Office Bldg., Madison 2, Wis.

Public Health Nurses—Salary range $395-$481 (five-step range). College degree in public health nursing. Experience in public health not necessarily required. PHN certification required to meet State Health Department nursing requirements. Three weeks' vacation per year. Retirement and Social Security benefits. Work 37½ hours per week. Thirty-five miles north of San Francisco. Generalized program. Contact Henry G. Mello, M.D., Solano County Health Officer, 228 Broadway, Vallejo, Calif.

Mental Health Nursing Consultant—Participate in community mental health program planning and implementation and state-level administrative functions; foster integration and coordination of mental health concepts and activities with general public health nursing program; act as consultant in surveys and research related to the community mental health program. Master's degree from accredited university program in mental health-public health. Salary $6,204-$7,290, based on experience. Three weeks' vacation, 11 holidays, half-salary retirement. Apply to Community Mental Health Services Division, Colorado State Department of Public Health, 4210 East 11th Ave., Denver 20, Colo.

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$25,000

Non-Profit Organization

We are one of the country's leading health service organizations and have a challenging opportunity for an experienced sales executive to become our Sales Vice President immediately.

The man we seek for this top management position is probably today the sales manager of a sizable health service organization operating either on a city or a state-wide basis. He should possess the administrative ability to direct a selling organization of over 25 men. He should also have the potential to assume higher responsibilities within the not too distant future.

Our company is fast-growing, ably managed and is located in a desirable city on the Eastern seaboard.

Your reply will be treated confidentially.

Box C-56, Employment Service
American Public Health Association
1790 Broadway New York 19, N. Y.

Public Health Nurse—for generalized program in suburban town ten miles from New Haven and Yale University. Connecticut registration and B.S. degree required. Personnel policies in accordance with those recommended by Connecticut Nurses' Association. Beginning salary $4,620, with adjustment made depending on training and experience. Director, Hamden Public Health and Visiting Nurse Association, Town Hall, Hamden, Conn.

Public Health Nurses—Nevada. Requires college degree in public health nursing, or graduation from an accredited school of nursing, plus one year of academic study in public health nursing, and two years' professional nursing experience. Work in an assigned area with considerable independence. Inservice training program. Present salary range $421-$511. Recommended salary as of July 1, 1961, $464-$562. Excellent fringe benefits. Superb recreational facilities and climatic conditions. Apply: State Personnel Department, Carson City, Nev.

Public Health Nurse III—for licensing of care facilities program. Inspects and evaluates nursing care of patients and facilities in nursing homes, hospitals, and homes for the aged. Salary $4,800-$6,000. Social Security and retirement plan. Liberal vacation and sick leave policies. Must be able to travel throughout the state. Car provided with travel expenses. Requirements: three years of progressively responsible public health nursing experience, including one in supervision or consultation. Completion of college program approved for public health nursing. Apply: A. T. Johnson, Personnel Director, Oregon State Board of Health, P. O. Box 231, Portland 7, Ore.

Public Health Nurse Consultant—Generalized nursing consultant to local health departments. Bachelor's degree in public health nursing; master's degree desirable. Three years' experience in public health nursing, including two in supervision. Salary $5,280-$6,600. Liberal travel allowance. Social Security and state retirement. Annual vacation and sick leave policies. Apply: A. T. Johnson, Personnel Director, Oregon State Board of Health, P. O. Box 231, Portland 7, Ore.

Public Health Nurses—First level. Oregon's state-wide program offers diversity of assignment, promotional opportunities, and liberal fringe benefits in scenic recreational locations. Must have graduated from an accredited school of nursing and completed one year in public health nursing. Salary $4,200-$5,940. Apply: A. T. Johnson, Personnel Director, Oregon State Board of Health, P. O. Box 231, Portland 7, Ore.

Public Health Nursing Supervisor—City-County Health Department with a generalized public health nursing program. Salary range $4,862-$6,140. Appointment at rate commensurate with training and experience. Good personnel policies; generous fringe benefits. Must have had an approved program of study in public health nursing leading to a bachelor's degree. Master's degree in public health nursing is desirable. Write Personnel Office, City of Eau Claire, City Hall, Eau Claire, Wis.

Public Health Nurse III (District Advisory Nurse)—Give guidance and counseling to all public health nurses in a multiple-county area regarding community organization and relationships, program planning, public health nursing technics, records, and reporting. Responsible for inservice education program for local public health nurses and evaluation of nursing services. Salary range $5,700-$6,780, plus travel allowance. B.S. degree with major in public health nursing and three years' generalized experience as a public health nurse. Special requirement: registration or eligibility therefor as a registered nurse in Wisconsin; certification or eligibility for certification as a public health nurse in Wisconsin. Write Miss Ione M. Rowley, Director, Public Health Nursing, 119 Monona Ave., Madison 3, Wis.

Regional Medical Health Officer

required by

Saskatoon Department of

Public Health

for

SASKATOON RURAL HEALTH REGION

Salary Range: $931–$1133 per month.

Requirements: M.D. Degree with diploma or Master's Degree in Public Health and experience in public health and medical administration; to direct a generalized public health program in an organized health region and to develop field activities for education and research in collaboration with the University of Saskatchewan. The appointee will work in close liaison with the Department of Social and Preventive Medicine in the College of Medicine.

Applications: Forms and further information available at Public Service Commission, Legislative Building, Regina, Saskatchewan, Canada.

Public Health Nurses and Sanitarians—Two nurses and two sanitarians for expanding generalized program. Five-day week. Liberal fringe benefits. Eight cents per mile for duty travel. Salary range from $421 to $511. Clark County Health Department, P. O. Box 392, Las Vegas, Nev.

Sanitarian—A young man, trained in public health and sanitation, for the position of sanitarian to the Borough of Hanover. The work deals with food, dairy, and water bacteriology; isolation and identification, plate counts, swab testing and chemical testing; establishment and operation of a laboratory; restaurant control; and advisor for the Board of Health on all public health and sanitation programs in cooperation with the health officer. The Borough has a population of 15,000. The starting salary will be $5,500. Please communicate by letter with Gabriel Zelesnick, M.D., Health Officer, Borough of Hanover, 108 Railroad St., Hanover, Pa.

Environmental Health Coordinator—for Division of Public Health and Preventive Medicine, Bergen Pines County Hospital, Paramus, N. J. Position involves coordinating and supervising environmental health services, and consultation in a metropolitan residential county. Requires M.P.H. or equivalent, five years' experience in responsible position in environmental health, health officer's license in New Jersey, nontraditional approach in public health. Salary $9,500 per year. Inquiries should be addressed to James G. Roney, Jr., M.D., Director of Division.

Director, Bureau of Environmental Sanitation—to direct all phases of state-wide sanitation programs. Degree in sanitary engineering or a master's degree in public health and six years' experience, three of these years in a supervisory capacity of a major phase of environmental sanitation. Liberal vacation, sick leave, and retirement benefits. Group insurance available. Merit system status. Salary $7,032-$8,784. Write Director of Personnel, Virginia State Health Department, Richmond 19, Va.

Health Education Project Coordinator (Male)—Excellent opening. Salary $560 per month; $6,720 per year; periodic salary increases. Tri-County District Health Department (250,000 population), suburban Denver, Colo. Vacancy for chief of health education section. Master's degree in public health education or equivalent required; at least one year's experience in community health or public health programs; abilities in planning, community organization, and public speaking. Top references required. Excellent benefits, vacation, sick leave, Social Security, modern health facilities. For details write William S. Haynes, M.D., 1451 Kenton, Aurora, Colo.

MEDICAL TECHNOLOGIST

Male or female. Must be registered (ASCP) and/or have bachelor's degree in medical technology. To perform chemical, bacteriological, and microscopic tests under supervision of a staff physician for Oakland County Health Department (Mich.) in Pontiac (in Detroit metropolitan area). Five-day work week.

Salary $5,100-$5,700 to start, depending upon experience, with promotional opportunities to $6,700.

Paid vacation and sick leave plans. Hospitalization, life insurance, Social Security, and retirement benefits.

Apply at:

Personnel Office
Oakland County Bldg.
1 Lafayette St.
Pontiac, Mich.

FEderal 3-7861

Health Educator—Senior or junior grade. Well developed program with staff of 105 in Chatham County Health Department, Savannah, Ga. M.P.H. required of both grades. Senior educator position requires three years' paid experience in an official health agency, or one year in an official agency and two in a voluntary health agency. Liberal fringe benefits and travel allowance. Salary, merit system scale, plus supplement and increment increases. Apply: W. D. Lundquist, M.D., District Medical Director, 23 East Charlton St., Savannah, Ga.

Health Educator—to work on state-wide program with local health departments and voluntary agencies. Unlimited opportunity for program development. Master's degree in health education and two years' experience. Salary $5,880-$7,344. Liberal vacation, sick leave, group insurance, and retirement allowances. Merit system status. Write Personnel Director, Virginia State Health Department, Richmond, Va.

Public Health Educator III (Chronic Disease)—Initiate and develop community interest and cooperation in the organization of state-sponsored local programs for rehabilitation of the aged. Assist in development of rehabilitation training institutes on state and local levels. Prepare audiovisual materials relating to aging and rehabilitation. Will be responsible for development of reference and information library. Desirable qualifications: M.P.H. or master's degree in education or related field, plus two years' experience, preferably related to position. Salary starts at $6,060; maximum $7,200. Travel allowance, vacation, sick leave, retirement, group insurance plans. Write R. J. Siesen, Personnel Officer, State Board of Health, Madison 2, Wis.

Public Health Educator—$532-$665. Challenging professional position with the San Jose City Health Department for a health educator interested in a community research project on home accident prevention. Should have some knowledge of statistics. Age 21-45. United States citizenship and completion of M.P.H. degree in public health education. Apply: Personnel Director, Room 211, City Hall, 801 North First St., San Jose, Calif.

Public Health Analyst—$489-$611. Technical statistical work for the San Jose City Health Department. Responsibilities include collection, analysis, and presentation of statistical data relating to surveys of births, deaths, diseases, etc. Age 21-45. United States citizenship, bachelor's degree in statistics, mathematics, or related fields, plus one year of experience in statistical work. Apply: Personnel Director, Room 211, City Hall, 801 North First St., San Jose, Calif.

Biostatistician—for the Colorado State Department of Public Health. Offices in Denver, Colo. Salary $492-$628. Address inquiries to Dalton Roberts, Chief, Administrative Services, Colorado State Department of Public Health, 4210 East 11th Ave., Denver 20, Colo.

Virologist—with doctoral degree and experience, to head well equipped public health virus laboratory. Starting salary dependent on qualifications. Range: $740-$890. Contact Administrative Officer, State Board of Health, Helena, Mont.

Manager, Animal Care—San Diego Zoo. Has line supervisory position over all keepers; reports directly to the assistant managing director. Has direct authority and responsibility for the care, feeding, hygiene, and welfare of all animal exhibits in the zoo. Responsible for the implementation of all programs, of the medical and curatorial staff in regard to animal health, hygiene, and care. Minimum of three years' past experience in direct supervision at the general foreman level. Two years of accredited college education leading to a bachelor's degree. Five years' experience in responsibility for the care, handling, health, hygiene, and welfare of wild or domestic animals. Starting salary $6,000. Please send résumé to James S. [illegible]on, Director of Personnel, San Diego [illegible], P. O. Box 551, San Diego 12, Calif.

Radiologist—to direct Tumor Clinic in upstate New York. Deep and superficial x-ray therapy, radium, and isotopes. Good personnel policies, vacation, sick leave, retirement, and Social Security benefits. For details, write to **Box M-28,** Employment Service, APHA.

Chief Consultant Psychologist—for planning, consultation, and supervising comprehensive psychological services in a state-wide community mental health program. Knowledge of research methods, community organization, teaching, and consultation with nonprofessionals. Ph.D. in psychology. At least four years' progressively responsible experience in psychology, including minimum of one year in community mental health work. Salary range $600-$745; proposed effective July 1, 1961, $685-$845. Apply to A. T. Johnson, Personnel Director, Oregon State Board of Health, P. O. Box 231, Portland 7, Ore.

Medical Social Worker—for health department located adjacent to Washington, D. C., serving population of 370,000. Excellent working conditions; staff numbers 130. Extremely varied and challenging program. Master's degree plus two years' experience required. Salary range $5,970-$7,464. Prince George's County Health Department, Cheverly, Md.

Dental Hygienist—for established dental health program in well equipped, modern health department. Salary range $4,320-$5,400 per year, plus liberal travel allowance. Write to J. H. White, M.D., Director, Weld County Health Department, P. O. Box 521, Greeley, Colo.

Microbiologist (Academic)—Ph.D.—To develop research program in general area of sanitary microbiology. Some teaching. Position open June 1, 1961. Calendar year appointment. Rank from associate professor to professor. M. L. Granstrom, Department of Civil Engineering, Rutgers University, New Brunswick, N. J.

POSITIONS WANTED

On Box Numbers, Address APHA at 1790 Broadway, New York 19, N. Y.

Public Health Veterinarian—with M.P.H. and one year of administrative, regulatory, and epidemiological experience with a County Health Department, desires position in government, teaching, or industry. **Box V-24,** Employment Service, APHA.

Public Health Coordinator—Experienced in coordination and planning in public health and medical care services, health education, rehabilitation, chronic illness, and alcoholism. Currently employed. Curriculum vitae on file. **Box C-55,** Employment Service, APHA.

Public Health, Medical Care Administration, or Administrative Research—Female, 47, married; M.P.H. Experience in hospital, welfare fund, and social service fields. Chicago resident. Can travel some. Mrs. Faiga F. Duncan, 2109 North Cleveland Ave., Chicago 14, Ill.

BOOK REVIEWS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

HEALTH SUPERVISION OF CHILDREN— Ann Arbor, Mich.: University of Michigan School of Public Health, Continued Education Service (109 South Observatory St.), 1959. 87 pp. Price, $2.00.

This publication is a compilation of 15 papers presented, plus a skit and a panel discussion, at the Inservice Training Course on Health Supervision of Children held in Ann Arbor on June 16-17, 1959. The course was held for health personnel in Michigan, and was planned jointly by the faculty of the University of Michigan School of Public Health and by staff members of the Michigan State Department of Health. A course such as this reflects the increasing interest of schools of public health in providing continuing education for public health workers, in cooperation with health departments.

The papers present content on the various areas of concern on the part of health personnel working with mothers and children. The topics covered include horizons in child health; the status and needs in child health in Michigan; the health department and the family; planning priorities in child health supervision; health supervision of the adolescent; health supervision as a means of improving family health; nutrition; oral health of children; screening tests; application of the principles of growth and development to health supervision of children; and meeting the emotional needs of the young child. The skit presented was that of activities in the well child conference related to the admission of an infant and her mother, and to the postconference counseling of the mother by the public health nurse. The panel discussion consisted of a multidisciplinary team discussing family counseling.

This book is recommended for public health personnel working with mothers and children. HELEN M. WALLACE

INDUSTRIAL WATER CONSERVATION— Ann Arbor, Mich.: University of Michigan School of Public Health, Continued Education Service (109 South Observatory St.), 1959. 115 pp. Price, $3.00.

This publication is a compilation of the papers presented at the course on Industrial Water Conservation held at the University of Michigan School of Public Health. The material was designed to serve plant engineers and industrial management personnel with a basis for consideration of the need for extended interest in the field of industrial water conservation.

The material presented in this publication provides an excellent background of information concerning the sources of water supply, specific uses in selected industries, and definite examples of successful programs of conservation. The industries represented in this presentation of the "How To Do It" approach include those manufacturing operations which are found on a nation-wide basis. The considerations given include concern for the volume of water required, the various problems concerned in water management, the factors involved in industrial plant site selection, and procedures for water use plant surveys.

Specific water conservation success stories are presented with considerable detail for the industries concerned with the production of food, power, chemicals, paper, pharmaceuticals, automobiles, steel, and oil.

Although specific references to the public health aspects of the problems of water supply are not emphasized, this publication provides the basis for an

understanding of industrial water supply problems and indicates the possibility of numerous public health implications. MORTON S. HILBERT

LEGAL ASPECTS OF PUBLIC HEALTH—Ann Arbor, Mich.: University of Michigan School of Public Health, Continued Education Service (109 South Observatory St.), 1959. 69 pp. Price, $2.00.

This is a mimeographed compilation of the papers given at a three-day conference on the legal aspects of public health held at the University of Michigan School of Public Health in early February, 1959. Edited copies of 15 papers appear, averaging some four pages each, with a summary by Dr. Vlado A. Getting.

The papers were given by a group of lawyers and public health officials practicing in Michigan. They concern mainly Michigan law and experience. The subjects covered are the legal rights, duties, and liabilities of health officers in Michigan; local versus state regulations in public health; and miscellaneous information on Michigan law and procedure (such as a review of the court system, rules of evidence, and the prosecution of a criminal case).

The material in this publication is of limited use outside Michigan. It is of spotty quality with the public health officials generally doing a better job in both content and philosophy than the lawyers. I particularly liked the papers of Dr. Otto K. Engelke and John E. Vogt. Dr. Engelke exhorts health officers to take a "long view" of the law, to interest themselves in their community's zoning law and over-all municipal planning, and not to concern themselves solely with the everyday problems of nuisance complaints and licenses. Mr. Vogt writes of "trends" in public health regulation in Michigan, but he bespeaks himself a philosopher, it seems to me. For example, " . . . the performance type of regulation appears to be receiving more consideration, as opposed to the specification type where every minute detail is spelled out" (p. 17), "Hand in glove with uniformity goes reciprocity" (p. 17). Dr. Getting's summary is also very well done. He adds a certain gloss of his own wide experience to the papers he has heard.

Since there is so little published material on public health law, this collection is worthy of mention and note for public health people in this country. WILLIAM J. CURRAN

PRESSURE GROUP POLITICS—THE CASE OF THE BRITISH MEDICAL ASSOCIATION—By Harry Eckstein. Stanford, Calif.: Stanford University Press, 1960. 168 pp. Price, $3.75.

This is a case study which deserves close reading. The author, a political scientist at Princeton, has already written a survey of the National Health Service in Britain and is well acquainted with the terrain. From the point of view of the political scientist, this study of the British Medical Association is intended to examine the limits of pertinence of the group theory of politics, that is, the nature and place of pressure groups in the functioning of a democratic political system. The study is concerned chiefly with the negotiations and consultations which take place between the British Medical Association (BMA) and the Ministry of Health on a variety of matters, some important, others almost trivial, when such contact is needed. The author discusses in turn the setting within which the political activities of the BMA are carried on, the channels of influence that are available and are used, and the political effectiveness of the BMA. These aspects are followed by two cases: one in which negotiation was successful, and a second which ended in failure.

From Professor Eckstein's analysis it is clear that the pressure group in this case functions largely where there is a

great amount of agreement on basic issues and "high degree of concern with narrowly delimited policies infringing upon technical, especially professionalized fields." On most occasions the representatives of the BMA and the university collaborate to devise the machinery needed to make the health services work. Disagreement tends to occur where financial interests are involved.

While this book deals with British affairs, Americans can learn a great deal from it about the relations between politics and health matters, that is, politics in the Aristotelian sense as relating to the government of a state, and not necessarily party politics alone. Comparable studies are needed for similar groups in the United States. If there is one criticism of Professor Eckstein's book, it is that the limits set for the study are rather narrow, but what he has done within them is excellent. This is a book to read and reflect on.

GEORGE ROSEN

DIFFERENTIAL DIAGNOSIS OF YAWS— By C. J. Hackett and L. J. A. Loewenthal. World Health Organization Monograph. New York, N. Y.: Columbia University Press (2960 Broadway), 1960. 88 pp. Price, $3.25.

The World Health Organization is sponsoring extensive mass campaigns in many underdeveloped countries in the tropics with the ultimate objective of eradicating yaws. In the later stages of such campaigns, when most of the yaws has been eliminated, it is important to identify accurately all recurrent or previously unrecognized cases.

In 1957, WHO published C. J. Hackett's "An International Nomenclature of Yaws Lesions." The present monograph, written by the same author in collaboration with Dr. L. J. A. Lowenthal, is a companion volume to that earlier publication and was prepared in response to requests for an illustrated handbook to assist field workers in making accurate differential diagnoses.

The monograph fully meets its objective. It is sturdily bound (important for field use), well organized (into lesions likely to be confused with early yaws, late yaws, and yaws hyperkeratoses) and beautifully illustrated (with pictures of lesions likely to cause confusion with yaws).

There probably will be little demand for this publication in the United States, but for those who have any connection with yaws control programs, this WHO monograph is a must.

FRANK W. REYNOLDS

MILK SANITATION ADMINISTRATION— Edited by Hugh E. Eagan, with a foreword by Herbert H. Rogers. Communicable Disease Center, Atlanta, Ga. Public Health Service Publication No. 728—Washington, D. C.: Superintendent Documents. 208 pp. Price, $1.25.

The milk sanitarian and other members of the public health team will find the material selected in this book to be a splendid review and refresher on milk sanitation work. Fifteen experts in the field of research, industry, and laboratory officials present in lecture fashion, or outline, the current concept on administration of milk sanitation and enforcement programs, covering current federal regulations, surveys, standards, laboratory, and related topics. Perhaps half of the book is a rehash for the experienced public health milk sanitarian. A highlight on research is the technical review on high temperature, pasteurization of milk and milk products for the inactivation of pathogenic microorganisms. The animal disease section goes far beyond the subject of milk, but good for other areas of public health disease control. Discussion on nutritional value of milk offers an interesting new approach for this subject. This book is strongly recommended for all health department milk control divisions, and is a made-to-order outline and study book for inservice training courses.

EVERETT C. HANDORF

TEACHING THE MENTALLY RETARDED CHILD—By Natalie Perry. New York, N. Y.: Columbia University Press (2960 Broadway), 1960. 282 pp. Price, $6.00.

State and community programs for mentally deficient (trainable) children are in the processes of rapid development and expansion. With the greatly increased demand for teachers, this book should prove to be most welcome. It should aid both teacher and parents of mentally deficient children not only to better understand what activities and learning experiences will benefit the children, but also why they will.

The professional educator often decries the "cookbook" while the parent and classroom teacher ask for specific suggestions and activities. "Teaching the Mentally Retarded Child" strikes a happy compromise between these two extremes. Miss Perry uses a developmental approach in suggesting a program for mentally deficient children. Each area starts with a general description incorporating principles and purposes followed by specific examples of activities to be used by teachers and parents. One of the most refreshing things is the justification or "why" included in each area under discussion.

Other pertinent and valuable points of the volume are: (1) the list of principles relating to teaching trainable children, (2) related readings at the conclusion of each chapter, (3) listing of names and functions of agencies that can contribute to a total program, and (4) discussion concerning school-parent problems and relationships.

G. Orville Johnson

WORLD REVIEW OF NUTRITION AND DIETETICS (Vol. 1)—Edited by Geoffrey H. Bourne. Philadelphia, Pa.: Lippincott (East Washington Square), 1960. 272 pp. Price, $12.00.

This 272 page volume is the first in an annual series initiated as "a forum for more lengthy and discursive reviews than are published in conventional journals." It includes a skillful compression of the history of nutrition into 19 pages by Professor E. V. McCollum and nine unrelated review articles. Those entitled "Effects of Androgens and Oestrogens on the Metabolism of Proteins and the Growth of Tissues" by Drs. P. Aschkenasy-Lelu and A. Aschkenasy; "Nutritional Significance of Vitamin B_{12}" by M. R. Spivey Fox and Dr. B. F. Chow; "Neoplasia and Nutrition" by T. A. McCoy; "Nutritional Factors in Anemia" by Dr. G. R. Wadsworth; and "The Nutritional Requirements of Embryos and the Repercussions of Deficiencies" by Dr. A. Giroud are valuable and authoritative summaries. The articles on the "Biosynthesis of Vitamin C" by Professor C. G. King and Dr. R. R. Becker, "The Use of Isotopes in Nutrition Research with Special Reference to Tritium" by Dr. J. Done and P. R. Payne, and "Basal Metabolism in the Japanese Population" by Dr. Shinjiro Suzuki cover these more specific topics in detail. The article "Treatment and Prevention of Kwashiorkor by Dr. M. Béhar and collaborators is a complete and current summary which includes a discussion of the use of indigenous protein sources for prevention. All of the articles have extensive reference lists and a general index is supplied. Nutrition workers will be glad to have this volume for reference and teaching purposes in the areas covered.

Nevin S. Scrimshaw

AIR SAMPLING INSTRUMENTS FOR EVALUATION OF ATMOSPHERIC CONTAMINANTS—Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists (1014 Broadway), 1960. Price, $7.50.

"Air Sampling Instruments" provides the industrial hygienists and air pollution control specialists with an up-to-date compendium of instrumentation currently available. Most of the equipment described is of interest to the

industrial hygienist. The catalogue of instruments is preceded by a series of authoritative technical papers on the principals of air contaminant measurements and the theory and practice of evaluating contaminants in the workroom and general atmospheres. The reader will find that the text of this section covers the ground with considerable insight into the practical aspects of contaminant evaluation in modern industrial hygiene and air pollution. However, the format makes this section somewhat difficult to read. The quality of the illustrations and lack of adequate subtitles interfere somewhat with rapid and complete understanding of the text. A great deal of useful information is there, nevertheless, to be dug out by the diligent reader.

The compendium of instruments is large and up to date. The reader is provided with a description of the methods of operation and operating range of the current air sampling instruments and information on where the commercial instruments can be obtained and where details about the noncommercial ones are available. Notably lacking, however, is any evaluation of the instruments, discussion of their limitations or information on when they should and should not be used. This limitation will perhaps not be a serious drawback for the experienced reader. The less experienced worker may find it difficult to make a selection of suitable instruments from the information provided.

JOHN A. MAGA

EUROPEAN SEMINAR ON SHELTERED EMPLOYMENT—New York, N. Y.: The International Society for the Welfare of Cripples, 1960. 171 pp. Price, $1.50.

The seminar on sheltered employment was organized by the Netherlands Society for the Care of Disabled. European countries represented by delegates included Austria, Belgium, Denmark, Finland, France, West Germany, the Netherlands, Norway, Poland, Sweden, Switzerland, and the United Kingdom.

The seminar focused its attention on five major subjects:

1. The conception and aims of sheltered employment
2. Organization and financing
3. Work projects
4. Rehabilitation and medical aspects of sheltered employment
5. The relationship of sheltered employment to the conditions of labor in any nation.

This report of the proceedings has meaningful content to those interested in the field of sheltered workshops. Its limitations arise, in part, from the English translations and, in part, from the fact that the material presented consists of the transcribed notes of the seminar proceedings.

In spite of these limitations, it should be of some value to those who are interested in providing sheltered work for the handicapped in this country.

A professional worker in this field will learn both from the similarities and the differences in the programs that have been developed in foreign lands.

JEROME S. TOBIS

ESSENTIALS OF HEALTHIER LIVING—By Justus J. Schiefferes. New York, N. Y.: Wiley (440 Fourth Ave.), 1960. 335 pp. Price, $5.50.

This is a short, stimulating, realistic college textbook on personal and community health, keyed to the needs and interests of college men and women.

It is a comprehensive coverage of all important topics in current health education, divided into five major areas: (1) Personal Health, 35 per cent; (2) Education for Family Living, 20 per cent; (3) Mental Health, 20 per cent; (4) Disease and Accidents, 10 per cent; and (5) Community Health, 15 per cent.

Summary review questions and suggestions for supplemental reading are

given at the end of each chapter. Chapter references are listed in Appendix C.

Appendix A on Common Human Ailments is a brief alphabetical catalogue of these giving further information on many and references as to where others can be found in the text.

The book is well illustrated with about 150 new pictures and charts which help to bring the previous 1954 edition of "Healthier Living" up to date. This newer book is only about one-half the size and yet gives a comprehensive coverage of all important topics in health education. Several hundred instructors in this area were interviewed in its preparation.

The chapters can be read or assigned in any order, but as arranged in this book there is a desirable sequence stressing personal health throughout the first five sections. Health and happiness are clearly correlated.

This text should be used early in the college curriculum in as much as only about half of those who enter college complete their courses. It could well be used in senior high schools.

WILLIAM E. AYLING

BLIND CHILDREN IN FAMILY AND COMMUNITY—By Marietta B. Spencer. Minneapolis, Minn.: University of Minnesota Press, 1960. 142 pp. Price, $4.25.

This remarkable book will appeal to professional workers and experts in child development who will be fascinated by the world of the young child who is blind. It would be sound indoctrination for all parents of very young blind children because of the soundness of the principles on which it is based, and which it explains straightforwardly through a skillful handling of text and excellent photographs. It is, of course, closely related to the Gesell studies and it has some of the drama of Steichen's "Family of Man," yet without its pictorial quality or its breadth and depth of coverage. Its "specialness" may, unfortunately, limit its appeal to the general reader, but it should become a valuable text for students of child development and required reading for specialists who work now or who are preparing to work with blind children.

Its purpose is to point up the "normality" of blind children. It focuses first on the fact that blind children follow the developmental stages characteristic of all children; the fact of blindness is there but it is assigned the lesser role and the disability is only a complicating factor in normal development. This is a sound way to look at the child who is blind.

Much of the effectiveness of the presentation lies in the excellent photographs by Frank Agar, Jr., and Carol Safer. The truth of the adage, "A picture is worth a thousand words," is certainly well demonstrated. They illustrate clearly and dramatically significant factors in child development, but without the carefully prepared brief text and succinct captions, the pictures would be much less effective.

The book should be of great help to parents of all blind children, but one might wish that more thorough treatment could have been given to the child whose development pattern is slower than "normal." Unfortunately, there are many blind children who are slow developers. Parents and counselors are looking for support and help in meeting the problems of these children. The book only provides superficial treatment in this important special area of need. Nor does the study point up differences between totally blind children and those with some useful vision. While basic principles of development are undoubtedly the same, there are ways of helping a child with some vision to use it to the full, and also to understand realistically the limitation of his small amount of sight. However, these omissions do not detract significantly from the excellence of the book. ALLEN W. SHERMAN

ATTENUATED INFECTION: THE GERM THEORY IN CONTEMPORARY PERSPECTIVE—By Harold J. Simon. Philadelphia, Pa.: Lippincott (East Washington Square), 1960. 349 pp. Price, $10.00.

The author of this book is concerned by the tendency, during the past 90 years, for students of microbial disease to focus their investigation and their thinking upon the infectious agent rather than the infected host, and to stress overt disease rather than the less dramatic but generally more prevalent attenuated or inapparent forms of infection. The author is clearly indebted to Rene J. Dubos and Walsh McDermott (both of whom have written forewords to this book) for much of the stimulus and the background of his viewpoint. His purpose in writing the book is to set forth and to illustrate "the concept that peaceful coexistence between organisms is the rule in nature rather than the exception."

This objective is a praiseworthy one, and one which some farseeing microbiologist such as Theobald Smith (whom Simon has selected for the frontispiece), Zinsser and Burnet (neither of whom is mentioned in the book), and numerous others have recognized, in one way or another, for many years. Simon's especial contribution, however, is his truly remarkable and imaginative collection, of illustrative examples of attenuated infection, drawn from studies on man, on other vertebrates, on insects, on bacteria, on plants, and on tissue cultures and backed up by 294 cited references. Tissue culture alone occupies 50 pages. Other sections treat of definitions; occurrence, distribution, and detection of attenuated infection; changes in host or parasite that influence attenuated infection; synergism and antagonism; advantages and disadvantages resulting from attenuated infection; and finally a comprehensive section on attenuated infection in man.

One may quarrel with the author over his definitions, or, in some instances, over their absence; one may regret the large omissions found in the subject matter dealt with; one may be put off by the sustained effort to fit everything the author observes into his preconceptions regarding infection; and one may wish that he had said what he had to say in half the space, as he could have done. Nevertheless, the function of a good book is not so much to present facts or to organize knowledge, for the reader, as it is to stimulate the reader to think. Judged by this criterion, "Attenuated Infection" is a very good book. GEOFFREY EDSALL

DENTAL HEALTH EDUCATION: For Dental Health Educators in School and Community Dental Health Programs with Special Consideration for the Education of Adults During Dental Treatment (2nd ed.)—By Frances A. Stoll. Philadelphia, Pa.: Lea and Febiger (Washington Square), 1960. 253 pp. Price, $5.50.

The last hundred pages (Chapter 9 on), dealing exclusively with dental health education methods and materials, apparently are good in many respects. (Examples of exceptions are such questionable items as listings of materials from commercial dentifrice companies, the confusion of information-giving with education, puppetry programs, and the personification of inanimate objects in health dramas.)

The first eight chapters lay the foundation for the education chapters. Interspersed with such widely accepted precepts as incremental maintenance care, community and school health councils, parent participation and education, and program evaluation are items which could be considered provincial, controversial, and inaccurate:

(1) Provincial, because much of the content deals with an almost-exclusive situation prevailing in New York State where dental hygienists may be certified as teachers.

(2) Controversial, because, for example, the

author delegates to the dental hygienists such questionable functions as dental inspections in the school as case-finding technics, direct teaching in the classroom, and home visiting. (In some instances, the author does cite conflicting opinions.)

(3) Not altogether accurate, because, as one example, the definitions of the "M component" of the DMF and the "c component" of the def indexes are not in accord with general usage.

Each chapter contains a selected bibliography (although some references are not up to date). The book has many typographical and grammatical errors. It can be recommended only for the experienced dental health worker who can judge the opinions, philosophies, and examples given, and draw from them suggestions to be tailored to his own situation. DAVID F. STRIFFLER

FOOD BECOMES YOU—By Ruth M. Leverton (2nd ed.)—Ames, Iowa: Iowa State University Press (Press Building), 1960. 198 pp. $3.50.

The author, associate director of the Institute of Home Economics, Agricultural Research Service, U. S. Department of Agriculture, is well qualified to write "a handbook to guide you in selecting the food that becomes you."

In addition to being reorganized and augmented, much of the second edition is rewritten. The freshness in the presentation of the accurate nutrition material, together with the appealing format, satisfies the reader. The food needs and habits for every stage of the life cycle are presented clearly and persuasively. However, the author gives especially helpful suggestions to the parents-in-waiting, mothers of young children, and to teenagers themselves.

Four of the 17 chapters discuss interestingly the hows and whys of weight control. Two entirely new chapters are concerned with the current thinking on the role of fats in the diet and with food fads. The book ends with a table of food values of selected foods commonly used.

The book is written for the lay public. At the same time, the professional person can learn much about ways to present technical material.

A. JUNE BRICKER

NEW WATER FOR A THIRSTY WORLD—By Michael Salzman. Los Angeles, Calif.: Science Foundation Press (73314 Ascot Station), 1960. 210 pp. Price, $5.95.

This book projects a theory that: (1) there are everlasting supplies of new waters in little-explored, solid-rock fissures within the earth; and (2) they originate from chemical processes occurring there and are unrelated to the familiar ground water, dependent on insoak, which man conventionally taps to supplement surface supplies.

These new waters, the author asserts, can be scientifically located and economically brought to the surface, even in deserts. Examples are cited. This would be a boon to our present dilemma —a rapidly closing gap between water demands and the fixed supply of the hydrologic cycle.

Water pollution and its health implications are briefly discussed. Mentioned is "the constant pollution of our drinking water by hundreds of new chemical products whose effects on human health are totally unknown." The author projects a possible link between today's increasing chronic (cancer and cardiovascular-renal) disease rate and drinking water supplies.

Apparently painstaking research went into the preparation of this thought provoking and somewhat convincing treatise. The effort was spurred by the work of Stephan Riess, a Californian. Riess formulated the "new water" theory and has gained attention in the press by drilling good water-producing wells where others had failed.

Although Riess has been called by some "a charlatan, a witch, and a fake," the author is convinced that the Riess theory is authentic and that it can ex-

plode certain established scientific and hydrologic principles if delved into with "open mind."

Except for brief recitations in highly academic and scientific terms and formulas, this book is easily read by the layman. Salzman demonstrates a remarkable cross-knowledge of the earth sciences and believes that less narrow-minded specialization could improve scientific achievement by chemists, physicists, metallurgists, mineralogists, and crystallographers.

Certainly for each of these professions this book holds something of interest. Likewise, both professionals and students in forestry, soil, agronomy, and the water resource field will find this book readable and an excellent reference. The book documents in detail 198 references. GORDON MCCALLUM

INTRODUCTION A LA HIGIENE INDUSTRIAL (Spanish text for Occupational Health)—J. J. Bloomfield. Lima, Peru: International Cooperation Administration. Institute of Inter-American Affairs, Public Health Division, 1959. 318 pp.

The author is one of the American pioneers in the field of industrial hygiene. For over 35 years he has been a student, a researcher, and an experienced worker in the development of adequate mining and industrial hygiene. He has devoted the last 13 years in South America helping to develop industrial hygiene.

This book contains a compilation of his papers and lectures in which he develops his view and deep knowledge in the field of industrial hygiene. The text is written in Spanish in a simple medical language understandable to the engineer and the sanitarian and with a technical approach of easy interpretation by the physician, though presented in the lecture-type style.

Of particular interest is the historical information on the development of industrial hygiene and its stages of progress up to the last decade in various countries, including data on compensation laws for accidents and occupational diseases. His coverage on atmospheric pollution is of valuable assistance to any new student in this field.

The Spanish-speaking student in public health or in industrial hygiene, either physician, engineer, or sanitarian, will find this book very appropriate and enlightening. NELSON BIAGGI

PATIENT-CENTERED APPROACHES TO NURSING—By Irene L. Beland and Ruth V. Matheney. New York, N. Y.: Macmillan (60 Fifth Ave.), 1960. 205 pp. Price, $4.50.

There is a boldness about this book which is refreshing. It directly challenges the nurse educator, the nurse practitioner and the hospital administrator. It challenges basic beliefs, and it challenges current practice in nursing.

In raising their voices provocatively, the authors do not play with words. They have seriously presented the culmination of five years of thinking and experimentation based on their firm conviction that nurses "can and must assume a greater share of the provision of direct nursing care services to patients."

You may agree or you may not agree with them. You will not remain indifferent even if you limit your reading to the last chapter which succinctly summarizes the bases of our conflicts in nursing and draws implications of the future.

The content is organized around the analysis of patients' needs with a delineation of 21 nursing problems which must be solved to deliver individualized, comprehensive nursing care. Interestingly enough these problems are listed on the frontispiece of the book probably with the intention of involving the reader. You may react by judging some of these to be objectives rather than problems, but it will not matter that much.

What you will find as you delve more intensely into this book is an application of these problems to a patient-centered curriculum in an associate degree program, a three-year basic diploma program, and a bachelor of science program. It would be worthy of consideration if those public health nursing educators and service personnel responsible for effective services to families and communities would attempt to examine the value of a similar approach.

There is also an inclusive list of references of which any serious reader of this book will make use.

MADELYN N. HALL

MICROSCOPIC-ANALYTICAL METHODS IN FOOD AND DRUG CONTROL— Food and Drug Technical Bulletin No. 1, prepared under the direction of Kenton L. Harris, Helen L. Reynolds, consulting editor. Food and Drug Administration, U. S. Department of Health, Education, and Welfare, Washington, D. C.: Government Printing Office, 1960. 255 pp. Price, $2.00 (paper).

In 1944, the Food and Drug Administration first published its Circular No. 1 on the "Microanalysis of Food and Drug Products." This volume supersedes that publication. But it is intended to be more than an expanded volume of laboratory methods for the detection of insect, rodent, and other types of contamination with extraneous materials, with introductory chapters on some phases of chemical microscopy. It aims to provide background information to help analysts in their practical application of microscopic methods in special cases that can not be covered in textbook fashion. It aims to clarify for regulatory officials and for manufacturers and producers of foods and drugs the place of microscopic procedures to supplement plant inspection and to aid in products control. These objectives have been admirably fulfilled.

The book is well written, and it is illustrated with nearly 300 meaningful figures. Each of the 11 chapters has been contributed by members of the scientific staff of the Food and Drug Administration, and most of the chapters provide a selected list of references. There are several useful tables, among which may be mentioned the keys for the identification of insects, and the tables of optical constants of many of the newer drugs that exist in crystalline form. The chapter dealing with the identification of commercial drug tablets and capsules necessarily is limited to a general discussion of principles, though valuable hints are provided for the guidance of workers who may be confronted with problems of this nature.

The authors have succeeded in bringing together for a single objective the technics of many different disciplines. While bacteriological methods are not included, this volume takes its place with such well known treatises as "Standard Methods of Milk Analysis," "Standard Methods for the Examination of Water, Sewage, and Industrial Waste," and related compendiums of laboratory methods. Every laboratory concerned with the sanitation of foods, and the quality control of foods and drugs, has a need for this authoritative publication.

FRANKLIN C. BING

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

AIR POLLUTION. World Health Organization Monograph Series No. 46. New York, N. Y.: Columbia University Press, 1961. 442 pp. Price, $10.00.

CARDIO-VASCULAR SURGERY. A Manual for Nurses. Edited by George H. Peddie and Frances E. Bush. New York, N. Y.: Putnam's, 1961. 170 pp. Price, $2.75.

CHILD DEVELOPMENT AND CHILD PSYCHIATRY. Edited by Charles Shagass and Benjamin Pasamanick. Washington, D. C.: Psychiatric Research Reports, American Psychiatric Association, 1960. 225 pp. Price, $2.00.

CRIME IN AMERICA. Edited by Herbert A. Bloch. New York, N. Y.: Philosophical Library, 1961. 355 pp. Price, $6.00.

ENZYMOLOGY IN THE USSR. A Review of the Literature. Chester W. Delong. Washington, D. C.: Gov. Ptg. Office, 1960. 189 pp. Price $.65.

EVALUATION OF DRUG THERAPY. Francis M. Forster. Madison, Wis.: University of Wisconsin Press, 1961. 167 pp. Price, $4.00.

GREAT EPIDEMIC, THE. A. A. Hoehling. Boston Mass.: Little, Brown, 1961. 217 pp. Price, $3.95.

HOME CARE. Hospital Monograph Series No. 9. David Littauer; I. Jerome Flance; and Albert F. Wessen. Chicago, Ill.: American Hospital Association, 1961. 110 pp. Price, $2.75.

HOSPITAL UTILIZATION IN THE METROPOLITAN AREA OF THE LOWER MAINLAND. A Study of the Referral Patterns in Operation in the Province of British Columbia, 1960. Vancouver, B. C.: Dr. James M. Mather, Faculty of Medicine, University of British Columbia, 1960.

HUMAN DECISIONS IN COMPLEX SYSTEMS. Warren S. McCulloch, et al. Annals of the New York Academy of Sciences, Vol. 89, Art. 5. New York, N. Y.: The Academy, 1961. pp. 715-896. Price, $3.50.

HUMAN FACTORS IN JET AND SPACE TRAVEL. A Medical-Psychological Analysis. Edited by S. B. Sells; Charles A. Berry; and Oliver K. Niess. New York, N. Y.: Ronald Press, 1961. 386 pp. Price, $12.00.

INFORMATION, PLEASE! For Women Only. Alfred Dreyfus II. New York, N. Y.: Vantage Press, 1961. 556 pp. Price, $7.50.

INTRODUCTION TO PARASITOLOGY (10th ed.). Asa C. Chandler and Clark P. Read. New York, N. Y.: Wiley, 1961. 822 pp. Price, $9.75.

KERNICTERUS AND ITS IMPORTANCE IN CEREBRAL PALSY. A Conference Presented by the American Academy for Cerebral Palsy —11th Annual Meeting, New Orleans, La. Springfield, Ill.: Thomas, 1961. 306 pp. Price, $8.75.

MEDICAL ENTOMOLOGY. William B. Herms and Maurice T. James. New York, N. Y.: Macmillan, 1961. 616 pp. Price, $12.50.

MENTAL HEALTH AND FINANCIAL MANAGEMENT: Some Dilemmas of Program Budgeting. Stanley T. Gabis. East Lansing, Mich.: Michigan State University, Bureau of Social and Political Research, 1960. 68 pp.

MILESTONE IN MICROBIOLOGY. Translated and edited by Thomas D. Brock. Englewood Cliffs, N. J.: Prentice-Hall, 1961. 275 pp. Price, $3.95 (paper bound).

MULTIPLE-CHOICE EXAMINATIONS IN MEDICINE. Guide for Examiner and Examinee. John P. Hubbard and William V. Clemans. Philadelphia, Pa.: Lea and Febiger, 1961. 186 pp. Price, $3.75.

NATIONAL LIBRARY OF MEDICINE. Index Mechanization Project. Bulletin of the Medical Library Association, Vol. 49, No. 1, Part 2. Washington, D. C.: National Library of Medicine, 1961. 96 pp. Price, $1.75.

PLANNING FOR BETTER HOSPITAL CARE. Eli Ginzberg and Peter Rogatz. New York, N. Y.: King's Crown Press, 1961. 131 pp. Price, $5.00.

PROCEEDINGS OF THE PNEUMOCONIOSIS CONFERENCE. University of Witwatersrand, Johannesburg, February 9-24, 1959. Edited by A. J. Orenstein. Boston, Mass.: Little, Brown, 1961. 632 pp. Price $22.50.

SCHOOL HEALTH AND HEALTH EDUCATION (4th ed.). C. E. Turner; Morley Sellery; and Sara Louise Smith. St. Louis, Mo.: Mosby, 1961. 481 pp. Price, $5.00.

SOCIOLOGY OF CRIME. Edited by Joseph S. Roucek. New York, N. Y.: Philosophical Library, 1961. 551 pp. Price, $10.00.

STUDIES IN ADULT GROUP LEARNING IN THE LIBERAL ARTS:
STUDY-DISCUSSION IN THE LIBERAL ARTS. Abbott Kaplan. 138 pp.
STUDY OF PARTICIPANTS IN THE GREAT BOOKS PROGRAM. James A. Davis. 160 pp.
COMPARATIVE STUDY OF LECTURE AND DISCUSSION METHODS. Richard J. Hill. 153 pp.
INTRODUCTORY GUIDE. John Walker Powell. 15 pp.
White Plains, N. Y.: Fund for Adult Education, 1960. Limited free distribution.

STUDY OF INFLUENZA. A translation of Ucheniye o Grippe by V. M. Zhdanov, et al. Public Health Service Publication No. 792. Washington, D. C.: Gov. Ptg. Office, 1960. 939 pp.

SYLLABUS FOR TEACHERS IN NAVAJO HEALTH. Bernice W. Loughlin, et al. Window Rock, Ariz.: Navajo Tribal Council, 1960. 275 pp. Price, $10.00.

SYNOPSIS OF CONTEMPORARY PSYCHIATRY (2nd ed.). George A. Ulett and D. Wells Goodrich. St. Louis, Mo.: Mosby, 1960. 307 pp. Price, $6.50.

TEACHING LEFT-HANDED CHILDREN. Margaret M. Clark. New York, N. Y.: Philosophical Library, 1959. 44 pp. Price, $2.75.

TEXTBOOK OF CHEMISTRY (8th ed.). Stella Goostray and J. Rae Schwench. New York, N. Y.: Macmillan, 1961. 502 pp. Price, $6.95.

WATER PURITY. A Study in Legal Control of Natural Resources. Earl Finbar Murphy. Madison, Wis.: University of Wisconsin Press, 1961. 212 pp. Price, $4.75.

WORK OF WHO 1960. Annual Report of the Director-General to the World Assembly and to the United Nations. New York, N. Y.: Columbia University Press, International Documents Service, 1960. 224 pp. Price, $10.00.

YOU CAN LEARN TO RELAX. Samuel W. Gutwirth. Hollywood, Calif.: Wilshire Book Company, 1961. 114 pp. Price, $1.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Raymond S. Patterson, Ph.D., F.A.P.H.A.

Needless Deaths — There is not much to be overly proud of in the record of 92,000 accidental deaths during 1960, even though the rate is slightly lower than that of the previous year because of population growth. The grisly list of catastrophic accidents is illuminated by the all-time high in mass killing by airplane. Home accidents, in the prevention of which public health is hopefully involved, increased by about 500 deaths over the unhappy record of the preceding year.

ANON. Accident Toll in 1960. Statist. Bull. Metrop. Life Insur. Co. 41,12:4 (Dec.), 1960.

Dent in Dental Caries—An insured "Comprehensive Dental Health Care Plan" has worked out well—it is here reported—for a Pennsylvania manufacturer's employees and their families. The dental profession also seems to like the plan. For the particular group the annual bill is a little less than $100 per family. The details will be of interest to all concerned with prepaid medical care.

ANON. Dental Care Coverage Administered by an Insurance Company: A Symposium. J. Am. Dent. A. 62,2:194 (Feb.), 1961.

Do-It-Yourself Public Health—In a suburban-rural county of Maryland some lay health associations built, own, maintain, and manage ten community health centers. A county-wide health council represents and influences the several community or neighborhood associations. Volunteer workers and county health department personnel staff the service centers. It is difficult, the authors conclude, to explain the successful outcome of this venture, in view of the limited attempts that have been made elsewhere to carry out the same sort of thing.

BEARD, J. H., and WOHLGEMUTH, M. C. Maryland Citizens in Action for Community Health. Pub. Health Rep. 76,1:67 (Jan.), 1961.

Dietary Fats—A committee of the American Heart Association "lays it on the line." With judicious qualifications the committee asserts that excessive dietary fats raise blood cholesterol levels and that cholesterol levels are related to atherosclerosis and its sequels. Milk and meat fats together with coconut and chocolate fats (the saturated fats) are the chief offending fats. Corn, cotton, and soya oils, and fish oils (the poly-unsaturated fats) are the chief good-for-you fats. Reduced fat consumption with reasonable substitution of good for bad fats is the committee's recommendation for a good diet. It might be well, the committee says, if the manufacturers of margarine, cooking fats, and oils would label the approximate fat composition of their products.

COMMITTEE REPORT. Dietary Fat and Its Relation to Heart Attacks and Strokes. J.A.M.A. 175,5:389 (Feb. 4), 1961.

Good News — Quoting from the boxed introduction to a laboratory paper on pulmonary cytology: "The cytologic examination of sputum and bronchial secretions has become a reliable method for detecting lung cancer. . . . A new method has been developed whereby a single concentrated sample has yielded an accuracy equivalent to four samples smeared by earlier methods." More than our laboratory members will be interested.

FARBER, S. M. Clinical Appraisal of Pulmonary Cytology. J.A.M.A. 175,5:345 (Feb. 4), 1961.

Healthier Teeth—This quotation is lifted from one of three papers addressed to nurses but of equal moment to all participants in health services. "In the past (the public health nurse's) role in the topical application, and the public water supply fluoridation programs was an important (one). But now with the widespread use of prescription fluorides and the possible use of dentifrices containing stannous fluoride, her role becomes not only increasingly more important but also more difficult." These sentences suggest the import and tenor of the three discussions.

GRISSOM, D. K. Fluoridation in Preventive Dentistry (and two related papers). Nursing Outlook 9,2:84 (Feb.), 1961.

Six Hundrd Antimicrobials—Although it is primarily medical, this is the sort of review paper—covering briefly the bacterial, fungal, and viral infections—that nonmedical health workers may very well clip and keep as a handy reference against the time when discussions or programs may involve them in the mechanics of communicable disease control. Incidentally, communicable disease control remains a prime concern of public health despite all the victories of miracle drugs and miracle workers, as this paper so clearly reveals.

HALL, J. W. Drug Therapy in Infectious Diseases. Am. J. Nursing 61,2:56 (Feb.), 1961.

Malformation Causes — A British pediatrician reviews for an MCH audience "some of the most significant established facts about the ways in which (congenital) malformations of various

organs are known to be produced." One reason this paper may be of interest to American maternal and child health people is that it comments on many studies made abroad that have not had wide notice in our own publications.

HAY, J. D. Congenital Malformations. M. Officer 105,4:43 (Jan. 27), 1961.

Improved Lab Tool—Three papers on the uses, limitations, and technical applications of the fluorescent method for the laboratory diagnosis of various infective agents will be of interest to all having anything to do with public health laboratory services. Difficulties that used to limit the practicality of the test have now been largely overcome so the technics are now within the reach of most diagnostic laboratories, one author says.

KENDRICK, P. L., et al. Fluorescent Laboratory Techniques (and two related papers). A.M.A. Am. J. Dis. Child. 101,2:149 (Feb.), 1961.

Nonpolio "Poliomyelitis" — Virologic studies were made on 358 cases of clinically diagnosed paralytic poliomyelitis. Those cases with severe paralysis were poliovirus-positive, but only a fifth of those with minimal paralysis were also positive to the virus. A wide variety of nonpolioviruses were implicated in the other 41 cases of meningomyelitic illnesses clinically resembling mild paralytic poliomyelitis. Let's hope this situation will not some day complicate our experiences with mass immunization via live-virus prophylaxis.

MAGOFFIN, R. L., et al. An Etiologic Study of Clinical Paralytic Poliomyelitis. J.A.M.A. 175,4:269 (June 28), 1961.

Coxsackie Culprit? — An unusual illness among children characterized by vesicular lesions in the mouth and on hands and feet occurred throughout California and perhaps in nearby states. A Coxsackie virus was isolated in cases on which viral studies were made by the laboratories of the California State Department of Public Health (an earlier outbreak had been announced from Canada). This is a notable example of the sudden emergence of a viral illness which returns to obscurity only to crop out again in a distant place.

MAGOFFIN, R. L., et al. Vesicular Stomatitis and Exanthem. J.A.M.A. 175,6:441 (Feb. 11), 1961.

Age and Cholesterol — Blood cholesterol levels are often included in the examination of people in their fifth or later decades of life. The study reported here suggests that the findings might be more meaningful if these were made before age 40.

ORVIS, H. H., et al. Serum Cholesterol in Normal Males vs. Males with Coronary Heart Disease: Differences with Respect to Age. Am. J. M. Sc. 241,2:167 (Feb.), 1961.

Infants vs. Virus Vaccines — Infants under ten weeks old were not readily infected with live attenuated polioviruses. Older infants seemed better able to form antibodies and were fully responsive by three months. Antibodies have persisted (to date) for as long as three and a half years.

PAGANO, J. S., et al. Variations in the Responses of Infants to Living Attenuated Polio Vaccines. New England J. Med. 264,4: 155 (Jan. 26), 1961.

Since 1492—Here are three excellent papers eminently suited for your clipping file: (1) a history of microscopy up to and including the interference microscope; (2) development and usage of the electron microscope; and (3) ultraviolet light microscopy. With the first you probably have a nodding acquaintance, the second you may know about but perhaps haven't used, the third you may just have heard about. Since most of the important developments in the third area have taken place since 1950, it is not strange that only research microscopists are experienced.

The papers are commended to all: not solely our laboratory brethren.

RICHARDS, O. W. Pioneer, Phase, and Interference Microscopes (and two related papers). New York J. Med. 61,3:430 (Feb. 1), 1961.

As a Team — In Minnesota two dozen official, voluntary, and professional associations have agreed in principal to work together to improve school health. A working plan has been adopted and strong leadership has been enlisted. All this has the potentiality for bringing together the diverse efforts of the often unrelated and conflicting enterprises that presently exist.

WALLACE, H. M., et al. The Development of a School Health Council. J. School Health 31,2:43 (Feb.), 1961.

If additional information is desired regarding the articles listed in this bibliography, please communicate directly with the publications in which they appeared; the addresses are furnished for your convenence.

A.M.A. Am. J. Dis. Child. (A.M.A. American Journal of Diseases of Children), American Medical Association, Chicago, Ill.

Am. J. M. Sc. (American Journal of Medical Sciences), Lea and Febiger, 600 Washington Sq., Philadelphia, Pa.

Am. J. Nursing (American Journal of Nursing), 10 Columbus Circle, New York, N. Y.

J. Am. Dent. A. (Journal of the American Dental Association), 222 North Superior St., Chicago, Ill.

J.A.M.A. (Journal of the American Medical Association), 535 North Dearborn St., Chicago, Ill.

J. School Health (The Journal of School Health), American School Health Association, 515 East Main St., Kent, Ohio.

M. Officer (Medical Officer), Chronicle House, 72-78 Fleet St., London, E.C.4, England.

New England J. Med. (New England Journal of Medicine), Massachusetts Medical Society, 8 The Fenway, Boston 15, Mass.

New York J. Med. (New York State Journal of Medicine), 750 Third Ave., New York, N. Y.

Nursing Outlook, American Journal of Nursing Company, 10 Columbus Circle, New York, N. Y.

Pub. Health Rep. (Public Health Reports), Gov. Ptg. Office, Washington 25, D. C.

Statist. Bull. Metrop. Life Insur. Co. (Statistical Bulletin of the Metropolitan Life Insurance Company), One Madison Ave., New York 10, N. Y.

CREDIT LINES

The Journal cannot furnish copies of items mentioned in Credit Lines. Please send requests to the addresses given.

Volumes I as Public Services

The first issue of "Currents of Public Health," published by Ross Laboratories, appeared in February. It is designed for professional persons, and purposes "to present measures that have been applied to solve various problems in the field . . . and to discuss current developments." Number 1 in the series, "Polio Immunization in America," describes selected approaches that have been taken to promote Salk vaccination including the 1956 California survey on attitudes about polio and its prevention, and the Boulder, Colo., immunization campaign of 1959. (The latter, incidentally, made use of six effective cartoons. These are reproduced in the Rocky Mountain Medical Journal, March, 1960. Modern Aesop-type fables accompany the drawings with such titles as "The Unfaithful Dog," "The Lazy Bear," etc.) This new periodical may prove to be a good source of workable ideas that have not yet come to one's attention. Write Ross Laboratories, Columbus 16, Ohio, to be placed on mailing list.

"Hingham (Mass.) Health Bulletin" came off the press for the first time during the winter. In concept it appears to be more a health education tool for the community than a medium for reporting on health department activity. Mailed to every home, it will identify with the community by educating in terms of the residents' health needs. The first four-page issue, for example, takes its cue from the fact that most Hingham homes use a septic tank or cesspool. Under the covering title "Save Time, Money and Aspirin—Know How Your S-D-S Works," Hingham Health Bulletin's feature article then informs the householder how the proper location, construction, alteration, and maintenance of these types of sewage disposal systems can prevent their being a public health nuisance. A brief paragraph toward the end of page four, however, points out how residents may get information about the public sewer, "the best system for permanent carefree service." Sample copies of the bulletin are presumably available. Thomas J. Kearns is executive health officer, Hingham Board of Health.

Makers or Breakers of Fluoridation

The concern expressed in professional circles over defeats of fluoridation at the November polls (see A.J.P.H., January, 1961, p. 149), the thinking expressed by the Commission on the Survey of Dentistry in the United States,* and a recent national television debate are indicators, if one needs them, that the public has not ceased to look upon fluoridation as a controversial issue.

The ultimate reasons that impel the public to regard fluoridation either as a menace or a boon have been difficult for the field worker to pinpoint. But he may now be in a better position to understand the problem because of an

* See A.J.P.H., March, 1961, p. 498. This column has since learned that copies of the Commission's Summary Report, published by the American Council on Education, cost $1. This is the preliminary report of a two and a half year study performed at the request of the American Dental Association by an impartial commission. The complete report "Survey of Dentistry" will be published soon.

analysis of some 35 pieces of research that have been done since 1957, in this country and abroad.

These, many of them unpublished, are described in the mimeographed, 27-page, "An Analytic Summary of Fluoridation Research: with an Annotated Bibliography." Authors William A. Gamson and Carolyn G. Lindberg of the Harvard School of Public Health draw on reports of these researches to summarize the current status of our knowledge of what makes the fluoridation issue an abiding social dilemma.

The two major sections of the analysis are on Psychological Approaches: Why People Vote For or Against Fluoridation, and Sociological Approaches: Why Fluoridation Is Passed or Defeated. The authors concede that it is difficult to compare many of the descriptive accounts of fluoridation controversies because "they employ no standard set of observational dimensions." But having said this they proceed to bring order out of confusion to a degree probably not achieved by scholars on this subject to date.

The analysis could be helpful in future planning in fluoridation campaigns. We find, for example, that "what originally seemed like a clear-cut relation (social characteristics of those pro and con) has on further study frequently appeared to be more complicated." It appears also that probably too high a value has frequently been placed on the label that the antifluoridation attitude is "antiscientific." The tendency to oversimplify and misinterpret the forces motivating persons in the opposing camp is, of course, a tactical error.

For a copy of this analytic summary write Benjamin D. Paul, Ph.D., Director, Social Science Program, Harvard School of Public Health, 55 Shattuck Street, Boston 15, Mass. This program produced many of the studies analyzed. Readers with specialized interests who want to discover what other studies at Harvard have turned up may also request a copy of "Community Aspects of Fluoridation: A Summary of Working Research Documents." This is in limited supply.

EDITOR'S NOTE: The glow of success when fluoridation has been achieved is not necessarily long-lived. The March, 1960, Journal (p. 440) told of Hartford's success in fluoridating after a nine-year campaign. This was heralded again recently in a special, 23-page issue of the Hartford Health Bulletin entitled "Historical Aspects of Fluoridation in our Community. (Single copies upon request to Hartford, Conn., Health Department, 56 Coventry St.) Basically a logbook, the first entry is for January 18, 1951, date of the city's first public meeting on the subject; last entry, January 21, 1960: "Fluoridation begins in metropolitan area." In January, 1961, however, the hopper of the Connecticut Legislative Assembly contained five bills that, if passed, would quite undo the job done over long years by proponents of fluoridation in this community. On the lighter side of this news was the appearance of two silent witnesses at the public hearings on these bills. Two healthy white rats, heavy drinkers of fluoridated water since birth, were introduced by State Health Commissioner Franklin M. Foote, M.D., as evidence that sodium fluoride is not rat poison.

Periodical on Engineering the Air

Although it is now into its third volume, "Air Engineering," a monthly, may not yet have come to the reader's attention. As the title implies it treats with air moving, conditioning, and pollution control. The November, 1960, issue, for instance, has feature articles on ultraviolet light sanitation systems, ventilation for pressure filters, and the "white room" design for Project Mer-

cury. Back pages include departments on the literature, news of the industry, and a question and answer section. Business News Publishing Company, 450 West Fort St., Detroit 26, Mich.; $3 a year.

Source Book With a Dividend

"A Guide Book Describing Pamphlets, Posters, Films on Health and Disease" annotates a selection of material that is available, technically accurate, consistent with expert opinion, and "free or" inexpensive. Publisher Maryland State Department of Health presents in dictionary form some 1,440 printed items and hundreds of films and filmstrips on topics ranging from accidents to x-rays. In addition MSDH lists 150 or more sources of health information materials in the back of the book. It would be useful to anyone—layman, student, practitioner, or allied worker—who wants to know what can be had on chosen health subjects and how it can be got. Write MSHD, 301 West Preston St., Baltimore 1, Md. It costs $1 and runs for 175 pages. One will be investing in a "growth publication"; it appears that dividends in the form of supplements will be issued without extra charge.

Speaking of teaching aids that cost nothing except the price of the source book, Educators Progress Service of Randolph, Wis., added a newcomer to its publications list in 1960, "Educators Guide to Free Science Materials" (first annual edition, $6.25). During the year guides to free films (20th annual edition, $9), filmstrips (12th, $6), and curriculum materials (17th, $7.50) were also issued. The first to be received in 1961 is the seventh annual edition of "Educators Guide to Free Tapes, Scripts and Transcriptions" which costs $5.75. All contain references to health education aids.

Golden Rule Can Prevent Accidents

"Thou Shalt Not Kill," a recent publication of the Association of State and Provincial Safety Coordinators, outlines a moral responsibility program for traffic accident prevention that can be activated with religious and fraternal organizations, schools, business, and other groups. (This is the first of four items to appear in conjunction with the ASPSC's 1961 campaign. Later quarterlies will be devoted to child safety, summer driving, and the woman's role.) It tells how to organize the program and what religion's role is, spells out ten commandments of good driving, gives public relations counsel, and illustrates official program materials. One dollar, from ASPSC, 1710 H St., N.W., Washington 6, D. C.

Tenth Report on Field Conference

The report of the 1960 Field Teaching Conference sponsored by the Public Health Nursing Section of the Southern Branch, APHA, for representatives of schools and agencies offering public health nursing experience to students is now available from Southern Branch, APHA, 1912 Eighth Ave. S., Birmingham, Ala.; $2. Marion Pool, College of Nursing, University of Kentucky, was chairman of the conference, which was focused on evaluation.

Documents Used in Aging Conference

The nation-wide publicity given the deliberations of the White House Conference on Aging in January precludes the need for a general news report of it in these columns. Meanwhile, pending issue of a proceedings and any implementation of conference recommendations that are reportable, a listing here of some of the background documents used by conferees may be found useful.

"Older Persons. Selected Health Characteristics. United States, July 1957-June 1959." Series C-No. 4 in Health Statistics from the U. S. National Health Survey. Public Health Service Publication No. 584-C4. (76 pages, Government Printing Office; 45 cents.)

"Recommendations of Workshop on Hospital-Nursing Home Relationships" conducted in February, 1960, under the joint sponsorship of the American Hospital, Medical and Nursing Home Associations, Blue Cross Commission, and Public Health Service. (This seven-page summary of the workshop is available free through the AMA. A "Proceedings" of it is available from AHA, 840 North Lake Shore Drive, Chicago 11, Ill.; $1.)

"Aging Americans: Their Views and Living Conditions." A report by the Subcommittee on Problems of the Aged and Aging of the Senate Committee on Labor and Public Welfare. (52 pages, Government Printing Office.)

"Programs for Older People." Report to the President, 1960. (71 pages, Federal Council on Aging.)

"Handbook of National Organizations with Plans, Programs and Services in the Field of Aging." (117 pages, WHCA.)

"Verbatim State Recommendations Related to Health and Medical Care." (93 pages, WHCA.)

"Background Paper on Health and Medical Care." (116 pages, WHCA, working document used by conferees in the section on this topic.)

It is possible that the WHCA, which was officed in the Department of Health, Education, and Welfare, also has a limited supply of some of the listed documents that were not published under WHCA auspices.

The Family of the Handicapped Child

"Handicapped children belong to emotionally healthy and mature parents and to neurotic and insecure parents. In other words, the typical parent of a handicapped child is, like most of us, a person who can take just so much and no more. There are many ways in which parents of handicapped children say 'This is too much.' Social workers and nurses have heard them all again and again. Let us hope that the ears of doctors, nurses, and social workers will be tuned to hear the true meaning of what is being said, and that their professional services will be broad enough and flexible enough to meet the needs. For if the families of handicapped children can be salvaged the children can probably be salvaged too."

E. S. Reid. Helping Parents of Handicapped Children. Children (Jan.-Feb.), 1958.

NEWS FROM THE FIELD

WHO News

Fourteenth World Health Assembly, I

First reports on the three-week meeting, held this year in New Delhi, indicate that all of WHO's associates and full members were represented. (For the record, Somalia, Cyprus, and Madagascar were the last to have been admitted as full members prior to the 14th WHA.) The recommended admission of Mauritania to full membership became a controversial issue with delegates from Iraq and Morocco holding that it was a phantom state or had no legal status. The trust territories of Tanganyika and Ruanda-Urundi were recommended for associate membership, the latter over the protest of the Soviet Union that it was administered by a puppet government. The admission of all three was approved. WHO now has 105 full and four associate members.

Sir Arcot L. Mudaliar, vice-chancellor of Madras University, and former chairman of the WHO Executive Board, was elected president of the assembly. Sir Arcot told delegates that since the assembly had decided in 1955 on a world campaign to eradicate malaria, there had been a significant decline in the incidence of this disease in many countries. "It gives hope," he said, "that the word eradication may be writ large as a significant sign for the manner of tackling other communicable diseases such as smallpox, cholera and waterborne and insect-borne diseases."

Prime Minister Nehru spoke on the achievements of the World Health Organization. Its success, he feels, stems from its ability to avoid the controversies and conflicts that afflict some other international organizations, but it does this without compromising objectives because of possible conflict. "For the first time in history," the prime minister said, "the world as a whole possesses the means to solve such primary problems of the welfare of populations as food, clothing, housing, health and education." Mr. Nehru pointed out that some 40 years ago in India the expectation of life at birth was 24 years. In 1947 it had advanced to 32 years and in the last 13 years the life expectancy had reached 42, and was still improving. D. P. Karmarker, minister of health of India, said that India's health progress was exemplified by a religious festival that recently brought together four million people at Allahabad without a single case of cholera occurring.

The outgoing president, Dr. H. B. Turbott, director-general of health of New Zealand, told the assembly that WHO stood for equality for all in matters of health. Much world disease, he said, arises from malnutrition, intestinal diseases due to faulty sanitation, and general ignorance of simple rules of health.

The Executive Board reported its endorsement of plans to improve environmental sanitation in 1962, in particular to assist in providing the maximum possible number of communities with safe and adequate water supplies. It also called on WHO "to play an essential part" in the fields of radiation health, radiation medicine, and human genetics, and to increase its present help to countries in initiating or strengthening national services relating to the use of radioactive materials in health work.

A message from Secretary-General Dag Hammarskjold stressed the significance of WHO's contribution to the development of the United Nations system

and international cooperation generally. He cited the UN civilian operations in the Congo where, he said, the United Nations and its specialized agencies had collaborated for the first time as a single team under the mandate of the Security Council.

WHO's Director-General M. G. Candau, in reviewing the work of the organization in 1960, reported that a highly successful attack on malaria-carrying mosquitoes had had an unexpected side effect in reducing the seriousness in East Africa of epidemics of a mosquito-transmitted virus disease known as O'nyong-nyong. First reported in Uganda in 1959, the disease has since affected some 750,000 East Africans. Of research, Dr. Candau said that "the success of most of our major campaigns to reduce ill health depends to a great extent on internationally concerted efforts" to understand etiology and to lay adequate foundations for positive health. "These medical and scientific advances," the director-general concluded, "are probably the most important in the world today when we think of the future of man on earth."

Reporter's Choice

Although "the general situation of the health services in the Congo before the crisis occurred was satisfactory . . . disintegration of the health services began to be noticed towards the end of 1959. The first symptom was antagonism . . . towards the activities of European Sanitarians: people began to refuse vaccination . . ." So writes Dr. S. Btesh, WHO's adviser on medical care to the Ministry of Health of the Congo, in the WHO Chronicle for February, 1961. His interesting article places the postcrisis health effort into the larger perspective of the Congo's plan for health services instituted in 1945. It could also whet the appetite for the longer story that may one day be written when the fortunes of health services in Africa's present upheavals can be seen in retrospect.

The prevalence of bilharziasis is on the increase in many countries, particularly in Africa, with the development of irrigation systems that do not conform to public health standards. Evaluation methods, diagnostic technics, snail control, and other topics are treated with in the "Report of the Second African Conference on Bilharziasis." This has recently appeared as WHO Technical Report Series, 1960, No. 204, 37 pages; 30 cents. Write Columbia University Press, 2960 Broadway, New York 27, N. Y. (Other recent issues in the 1960 series are: No. 196, "Medical Supervision in Radiation Work: Second Report of the Expert Committee on Radiation"; and No. 200, "Requirements for Biological Substances: Report of a Study Group." Both are 31 pages and published in French and Spanish, as is No. 204; 30 cents. Also available now is the annual "The Work of WHO, 1960," a 224-page document listed for $2).

WHO and UNICEF helped the Philippines start a program for the improvement of midwifery services in 1953. Regional centers train nurse-midwife supervisors who in turn teach and oversee the work of hilots (traditional name for birth attendants). With the current help of Lotta Goggins, regional nursing consultant of the Children's Bureau, plans are now under way to set up advanced education programs to prepare hilots themselves for teaching and supervisory positions.

A special issue of World Health (January-February, 1961) reviews the health problems of the seven countries in WHO's Southeast Asia Region. Typhus is taken as an illustration of progress: only 40 cases were reported in 1959 with no deaths from the disease. Diagnosed leprosy cases number

around 380,000 but "careful estimates put the actual number at more than 2,000,000." A revelation: "India alone has half a million villages. Merely to put one simple sanitary well with a small hand pump into each of these villages would cost $70 million. This is three and a half times what WHO will spend on its work throughout the world during 1961." Population and mortality figures, life expectancy, health facilities, and important diseases are given for each of the seven countries.

The Department of Economic and Social Affairs of the United Nations has published "Study on Traffic in Persons and Prostitution." This is obtainable upon request through the American Social Health Association. In distributing the report, ASHA speaks of it as a comprehensive discussion of prostitution and an "effective answer to the standard arguments of those who believe it should be tolerated in one form or another." Suggests a program for preventing the practice, for repressing traffic, and for rehabilitating prostitutes. ASHA is at 1790 Broadway, New York 19, N. Y.

Public Health Service: Polio, et al.

Luther L. Terry, M.D., newly designated Surgeon General of the Public Health Service, has endorsed the recommendations made in January by the Advisory Committee on Poliomyelitis Control for a stepped-up program to prevent polio epidemics in 1961. In transmitting copies of the recommendations to state and territorial health officers, Dr. Terry called particular attention to the committee's findings that the recommended dosage schedules may be modified to permit the administration of three shots of Salk vaccine before summer to persons who have not as yet had any vaccine.

In line with the committee's suggested program, the PHS has offered to help identify neighborhood groups needing protection against polio, and to bring these nonimmune groups to the attention of appropriate medical agencies. Also the Communicable Disease Center is to encourage behavioral studies that will identify the reasons that people refuse immunization and discover methods for overcoming their objections.

The Division of Radiological Health, Public Health Service, has developed a system for a state-wide survey to determine whether dental x-ray units have defects which might give unnecessarily heavy exposure.

The state dental associations in Indiana, Missouri, North Dakota, and Utah, with a combined total of 2,963 dental x-ray units, are cooperating in a test of the new procedure. Other states are expected to participate when the resources of federal and state health agencies permit.

A sensitive sheet of x-ray film is mailed to each dentist in the survey area. He exposes it to the beam from his x-ray unit and then returns it to the state health department. This is forwarded to the PHS's Radiological Health Laboratory in Maryland which determines whether the corresponding unit's beam size, shape and filtration, and beam leakage at the cone of the tube meet recommended standards. Survey results are then sent to the state health department for transmission to the dentist.

Five officials from the Canadian Department of Health and Welfare led by its chief of Emergency Health Services, Dr. Arthur C. Hardman, met in February with their counterparts in the Department of Health, Education, and Welfare and the Office of Civil and Defense Mobilization. At the conference, arranged through the Office of the Surgeon General, they exchanged

information on the concept and organization of civil defense health programs.

The visitors were briefed on the Public Health Service's responsibilities and programs, and the emergency programs of the Food and Drug Administration and other federal agencies. The Canadian program emphasizes the relationship between the CDHW and the Canadian Army.

Doctors Form Union

Three years of planning by the physicians and dentists of the New York City Department of Health have resulted in the formation of what is said to be the first collective bargaining unit of doctors in the country. It is certified by the city's labor department. The health department recognizes the union as the organization which officially represents this employee group.

Called the Doctors Association of the Department of Health, it will work toward salary increases and other employment security benefits. Beneficiaries will be the some 1,000 doctors who, DADH states, have worked on a provisional basis with the health department since the 30's. According to Robert M. Robbins, M.D., president, school physicians and dentists, for example, are being paid far less than they can earn in private practice. The association begins its history with 700 members. It is reported to be completely independent of any organized labor group.

Academy of Occupational Medicine

At the annual meeting of the American Academy of Occupational Medicine held in Detroit, Mich., February 8-10, 1961, the following officers were elected:

President—John L. Norris, M.D., Rochester, N. Y.

Vice-President—Leo Wade, M.D., New York, N. Y.

Secretary—Paul J. Whitaker, M.D., Milwaukee, Wis.

Treasurer—Jack H. Wolfsie, M.D., Linden, N. J.

The Academy's Award of Honor was presented to Arthur J. Vorwald, M.D., Wayne University Medical School, Detroit, Mich.

More Teeth in Accident Prevention

Since June 1, 1960, new applicants for drivers licenses in Pennsylvania must be free from disabling neurologic, cardiovascular, neuropsychiatric, or convulsive disorders, alcoholism, narcotics addiction, and uncontrolled diabetes and epilepsy. Of 78,000 examined in the first six months of the program, 67 were rejected, 45 of them men. Neurologic and neuropsychiatric disorders were the main cause for disqualification. The state plans over the next ten years to have all its 5,500,000 drivers examined for medical eligibility for licensing. The Pennsylvania Department of Health has prepared an examination form for the guidance of private physicians. (See A.J.P.H., September, 1960, p. 1467.)

More on Alaskan Health Services

The Division of Public Health, Alaska Department of Health and Welfare, now numbers some 230 staff members. Alaska has placed 31 health centers throughout the state. In larger population centers these have a permanent staff and are supported in part by the community. Departmental personnel serve more outlying communities on an itinerant basis. Public health services are financed principally by state funds. As boroughs are formed, in accordance with the new state constitution, they are expected to assume public health responsibilities. Alaskan funds available for health care were supplemented by grants from the Public Health Service

of over $2 million in fiscal 1959-1960.

Samples of the state's health problems are noted in Volume 18, No. 1 (February, 1961) of Alaska's Health and Welfare; 204 cases of infectious hepatitis occurred in the last half of 1960, with 66 of the cases reported in December; 37 cases of rabies, 29 from Arctic foxes, were confirmed by the state laboratory and the Communicable Disease Center, Atlanta, during 1960.

The first 17 volumes of the publication cited were known as Alaska's Health. The change in title signifies the change in the state's organization for health services. (See A.J.P.H., December, 1959, p. 1620.) Before statehood, health and welfare departments were separate. Now in units to themselves, they are joined by Mental Health, which was a section of the former health department, and by Youth and Adult Authority to make up the four Divisions of ADHW. Acting director, Division of Public Health, is E. O. Wicks, M.D. A full description of the state's program appears in Public Health Reports, October, 1960, pages 878-912.

Continuing Education for a Faculty

Twelve faculty members of the Departments of Public Health Practice and Maternal and Child Health at the Harvard School of Public Health put on a week-end institute for themselves in February on "Group Process and Seminar Teaching." By report it was "successful and perhaps unique." Specialists in group dynamics and education, Kenneth Benne, director, Human Relations Center, Boston University, and Don Orton, president, Lesley College, Cambridge, served as consultants.

In two general sessions the consultants presented didactic material on learning theory which was then discussed in small groups. Discussants were encouraged to take note of their own behavior whenever this could throw further light on the understanding or application of didactic content. The ways of working with the student from another culture, the lecture method vs. the seminar, and the means of building evaluation into course structures were some of the technical subjects explored. A follow-up meeting will enable the faculty members to share their experiences in putting some of the new technics they learned into effect.

Educate on Hazards of Alcoholism

The Narcotic and Alcoholism Advisory Committee of the Montana State Board of Health has found, as similar bodies in other states have, that in terms of public welfare and court costs, and costs of absenteeism and unemployment, alcoholism is expensive—in Montana to the tune of an equivalent of some $36 million a year.

This advisory committee has made 11 recommendations for a realistic attack on the problem. These encompass more active cooperation between the Board of Health and the State Hospital, and more consultation made available to communities and "to local general hospitals . . . so they will accept alcoholics for care and provide the necessary facilities."

Among its other advices the committee emphasized the importance of working through the educational institutions in the state: "provide education on the several phases of alcoholism for professional groups who receive their college education within the state; for the Montana teacher training institutions and elementary and secondary schools, alcoholism education should be included as part of the total educational program . . . at all levels of training . . . (and) more objective scientific information on alcoholism should be provided to school faculties. Alcoholism should be presented as a disease with multicausal factors."

PERSONALS

GENERAL THEODORE C. BEDWELL, JR., MC, USAF (M.P.H.),† formerly chief surgeon, Strategic Air Command, is now commander, USAF Aerospace Medical Center (ATC), Brooks Air Force Base, Tex.

AGNES W. BREWSTER,* formerly medical economist, Division of Research and Statistics, Social Security Administration, is now medical economist, Division of Public Health Methods, Office of the Surgeon General, Public Health Service, Washington, D. C.

N. JACK BURRIS, formerly District IV sanitary engineer, is now chief, Water Supply Section, Division of Sanitation, Kansas State Board of Health.

FRANK A. BUTRICO,* formerly chief, Engineering Resources Program, Public Health Service, is now assistant chief engineer for the Public Health Service, Office of the Surgeon General, Washington, D. C.

DORIS G. CHANDLER, M.P.H.,* formerly health education consultant, Montana State Board of Health, is now executive director, New Britain (Conn.) Area and Farmington Valley Tuberculosis and Health Association.

IRA O. CHURCH, M.D., M.P.H.,* for the last ten years director of public health, Sacramento County (Calif.) Health Department, has retired. He had formerly directed the Contra Costa County (Calif.) unit, and health departments in Kansas, New Mexico, and Michigan.

ROY L. CLEERE, M.D., M.P.H.,* director of public health, Colorado State Department of Public Health, received the 1960 McCormack Award of the Association of State and Territorial Health Officers.

SAMUEL W. DOOLEY, M.D.,* formerly executive director, Cancer Care, Inc., is now associate director, Welfare Medical Care Project in Pediatrics, Public Health Research Council of the City of New York.

RAYMOND D. FEAR, M.D., Dr.P.H.,* for the past 13 years health commissioner of Dutchess County, N. Y., has retired.

WARFIELD GARSON, M.D., M.P.H.,* formerly head, Department of Experimental Medicine, School of Public Health, University of North Carolina, is now director, Central Health District, Allegheny County (Pa.) Health Department, Pittsburgh.

JUDSON HARDY, formerly public affairs officer, Division of Radiological Health, Public Health Service, is now chief of the public information section, Office of Research Information, National Institutes of Health, Bethesda, Md.

W. D. MORTIMER HARRIS, M.D., M.P.H.,† formerly director of research activities, Office of Program Planning, is now chief, Division of Epidemiology, Bureau of Preventable Diseases, New York City Department of Health.

MARJORIE M. HESELTINE,* chief, Nutrition Section, Children's Bureau, has retired.

R. BRUCE JESSUP, M.D.,† formerly acting assistant professor of pediatrics, Stanford University School of Medicine, is now consultant in rural health, Bureau of Maternal and Child Health, California State Department of Public Health.

RUSSEL V. LEE, M.D.,† executive head of the Palo Alto (Calif.) Medical Clinic, has retired. He is succeeded in this post by EDWARD LISTON, M.D.

EMILY K. LYDON,† formerly health education consultant, New York Tuberculosis and Health Association, is now public health educator, New York City Department of Health.

LORENZ S. MORGAN, formerly chief, Mine Drainage Section, Pennsylvania Department of Health, with the department 36 years, is now director of environmental health, Bucks County (Pa.) Health Department.

HAROLD C. MUFSON,† formerly assitant administrator, Long Island Jewish Hospital, is now assitant hospital administrator, Kings County Hospital, New York City Department of Hospitals.

WILBUR E. PALMER, M.P.H.,* recently on assignment as health officer, International Cooperation Administration, New Delhi, India, has been assigned to the ICA mission in Katmandu, Nepal, following home leave.

JOHN B. PERKINS, formerly treasurer-business manager, Christian Herald Association, New York City, is now administrator, Rehabilitation Institute of Chicago.

C. A. PIGFORD, M.D., M.P.H.,* formerly director, Lubbock (Tex.) County Health Department, is now director of public health, Houston, Tex.

EDWIN F. POAGE,† formerly assitant administrator, St. Mary's Hospital, Passaic, N. J., is now administrator, Rolling Hill Hospital and Diagnostic Center, Elkins Park, Pa.

GEORGE ROSEN, M.D., Ph.D.,* Editor of the American Journal of Public Health and professor of health education, Columbia University School of Public Health and Administrative Medicine, will give the annual Fielding H. Garrison Lecture of the American Association for the History of Medicine in May.

CORA SHELSTAD, R.N., M.P.H.,† formerly a county public health nurse in North Dakota,

* Fellow.
† Member.

is now mental health nurse consultant, North Dakota State Department of Health.

WILLIAM C. SPRING, JR., M.D., M.P.H.,* formerly medical director, Laboratories Division, Chas. Pfizer & Co., Inc., is now secretary, Council on Drugs, American Medical Association.

L. GENE SUHR, formerly assistant to the chief, Stream Pollution Control Section, Division of Sanitation, is now sanitary engineer, District VI, Kansas State Board of Health, with headquarters in Hays.

WILLIAM A. TOWNSEND, M.D.,† formerly health officer, District No. 3, New Mexico Department of Public Health, is now director, Division of Local Health Services, Wisconsin State Board of Health.

DOROTHY L. TRICE, M.D., M.P.H.,† formerly assistant public health physician, is now health officer, Brownsville District Health Center, New York City Department of Health.

RAY E. TRUSSELL, M.D., M.P.H.,* became commissioner of hospitals, City of New York, on March 1. He remains as director and De Lamar professor of administrative medicine, School of Public Health and Administrative Medicine, and associate dean, Faculty of Medicine, Columbia University, on special, then sabbactical leave.

CLAIR E. TURNER, Dr.P.H., D.Sc.,* professor of public health emeritus, Massachusetts Institute of Technology, is now temporary consultant to WHO and UNESCO in developing plans to promote health education in public schools and teacher training institutions.

JULES E. VANDOW, M.D.,* formerly chief, Division of Social Hygiene, is now with the Office of Program Planning, Research and Development, New York City Department of Health.

JAMES L. WARDLAW, JR., M.D., M.P.H.,* formerly acting director, Bureau of Maternal and Child Health, Florida State Board of Health, is now director, Section of Maternal and Child Health, Wisconsin State Board of Health.

DEATHS

BETTY JOE BRIDGES, R.N.,† public health nurse, Jefferson (Ga.) Health Department (Public Health Nursing Section).

ARTHUR F. CHAISSON, M.D.,† district medical health officer, Provincial Department of Health, Fredericton, N.B., Canada, August, 1960 (Health Officers Section).

FRANK V. CHAPPELL, M.D.,† director, Hillsborough County (Fla.) Health Department, November 20, 1960 (Health Officers Section).

GEORGE F. COOK, M.D.,† health officer, Planville, Conn., October 19, 1960 (Health Officers Section).

PATRICIA I. HEELY, R.N.,* director, Bureau of Public Health Nursing, New York City Department of Health, February, 1961 (Unaffiliated).

CHAUNCEY A. HYATT,* swimming pool consultant, Halogen Supply Co., Chicago, Ill., December 24, 1960 (Engineering Section).

GRANVILLE W. MOORE,† vice president and general manager, Greater Dallas Planning Council, Dallas, Tex. (Public Health Education Section).

ELLIOTT H. PENNELL,* statistician and chief, Statistical Section, Division of Chronic Disease, Public Health Service, Bethesda, Md., on February 6 (Statistics Section).

ROBERT L. QUIMBY, M.D.,† medical director, Division of Industrial Medicine, Loss Prevention Department, Liberty Mutual Insurance Company, Boston, Mass. (Occupational Health Section).

DORIS L. ROBINSON, R.N.,* director of public health nursing, San Francisco (Calif.) Health Department, December 3, 1960 (Public Health Nursing Section).

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CONFERENCES AND DATES

American Public Health Association. Eighty-Ninth Annual Meeting, Detroit, Mich. November 13-17, 1961.

State and Regional Public Health Meetings—April, May, and June, 1961:

Arizona Public Health Association. El Tovar Hotel, Grand Canyon. May 17-19.

Arkansas Public Health Association. Hotel Marian, Little Rock. May 9-10.

Colorado Public Health Association. Continental Pueblo Motel, Pueblo. May 18-19.

Georgia Public Health Association. DeSoto Hotel. Savannah. May 21-24.

Idaho Public Health Association. Lewis and Clark Hotel. Lewiston. May 12-13.

Illinois Public Health Association with Middle States Public Health Association. Morrison Hotel, Chicago. April 12-14.

Indiana Public Health Association. Severin Hotel, Indianapolis. April 27-28.

Iowa Public Health Association. Hotel Ft. Des Moines, Des Moines. May 18-19.

* Fellow.
† Member.

Kansas Public Health Association. Town House Hotel, Kansas City. April 3-5.

Kentucky Public Health Association. Kentucky Hotel, Louisville. April 11.

Louisiana Public Health Association. Bentley Hotel, Alexandria. April 27-28.

Massachusetts Public Health Association. Spring Meeting. Western Junior High, Brockton. April 20.

Michigan Public Health Association. Pantlind Hotel, Grand Rapids. May 10-12.

Middle States Public Health Association with Illinois Public Health Association. Morrison Hotel, Chicago. April 12-14.

Missouri Public Health Association. Hotel President, Kansas City. May 8-10.

New Mexico Public Health Association. New Mexico State University, Las Cruces. April 20-21.

New York City Public Health Association. New York Academy of Medicine, New York, N. Y. May 16.

New York State Public Health Association. Community War Memorial. June 6-8.

North Carolina Public Health Association. O'Henry Hotel, Greensboro. June 29-30.

North Dakota Public Health Association. Memorial Building, Jamestown. April 24-25.

Ohio Public Health Association. Deshler-Hilton Hotel, Columbus. May 16-17.

Oklahoma Public Health Association. Hotel Tulsa, Tulsa. March 8-10.

Puerto Rico Public Health Association. Intercontinental Hotel, San Juan. March 1-3.

South Carolina Public Health Association. Poinsett Hotel, Greenville. May 11-13.

Texas Public Health Association. Texas Hotel, Fort Worth. March 5-8.

United States-Mexico Border Public Health Association with Western Branch, APHA. E. Cortez Hotel, San Diego, Calif. June 26-29.

Utah Public Health Association. University of Utah, Salt Lake City. May 15-16.

Virginia Public Health Association. Roanoke Hotel, Roanoke. June 6.

West Virginia Public Health Association. Hotel Morgan, Morgantown. May 10-12.

Wisconsin Public Health Association. University of Wisconsin, Madison. June 20-21.

Wyoming Public Health Association. Casper. May 12-13.

Southern Branch, APHA. Sheraton Hotel, Louisville. April 12-14.

Western Branch, APHA, with U. S.-Mexico Border Public Health Association. El Cortez Hotel, San Diego, Calif. June 26-29.

Meetings of Other Organizations:

Air Pollution Control Association. Hotel Commodore, New York, N. Y. June 11-15.

American Academy of General Practice. Miami Beach Auditorium, Miami Beach, Fla. April 18.

American Academy of Pediatrics (Spring Session). Washington, D. C. April 10-12.

American Association for Health, Physical Education, and Recreation. Chalfonte-Haddon Hall, Atlantic City, N. J. March 17-21.

American Association of Industrial Nurses. Hotel Biltmore, Los Angeles, Calif. April 11-13.

American Association of Pathologists and Bacteriologists. Drake Hotel, Chicago, Ill. April 26-28.

American College Health Association. Park Shelton Hotel, Detroit, Mich. April 26-29.

American College of Nurse-Midwifery. Sheraton-Gibson Hotel, Cincinnati, Ohio. April 7-8.

American College of Physicians. Americana Hotel, Miami Beach, Fla. May 8-12.

American Diabetes Association. Commodore Hotel, New York, N. Y. June 24-25.

American Home Economics Association. Cleveland, Ohio. June 27-30.

American Medical Association. Annual Meeting. Statler Hilton Hotel, New York, N. Y. June 26-30.

American Medical Association. Eighth National Conference on Physicians and Schools. Sheraton Towers, Chicago, Ill. March 9-11.

American National Red Cross. Cincinnati, Ohio. May 8-10.

American Nurses' Association. Conference on Legislation. Sheraton-Park Hotel, Washington, D. C. March 22-24.

American Orthopsychiatric Association. New York, N. Y. March 23-25.

American Pharmaceutical Association. Hotel Sherman, Chicago, Ill. Week of April 23.

American Psychiatric Association. Morrison Hotel, Chicago, Ill. May 8-12.

American Society of Medical Technologists, Olympic Hotel, Seattle, Wash. June 11-16.

American Water Works Association. Detroit, Mich. June 4-9.

Association for the Aid of Crippled Children. New York, N. Y. April 26.

Association of Schools of Public Health. Harvard University, Boston, Mass. April 10-12.

Blue Cross Association. Edgewater Beach Hotel, Chicago, Ill. April 19-20.

Canadian Dietetic Association. Hotel Vancouver, Vancouver, B.C. June 13-15.

Canadian Public Health Association. Regina, Saskatchewan. June 6-8.

Child Study Association of America. New York, N. Y. April 10.

Congrès International des Techniciens de la Santé (International Health Exhibit) Paris, France. April 10-15.

Industrial Medical Association. Biltmore Hotel, Los Angeles, Calif. April 11-13.

Maternity Center Association. New York, N. Y. March 2-3.

National Conference on Social Welfare. Minneapolis, Minn. May 14-19.

National Council on Alcoholism. Shoreham Hotel, Washington, D. C. April 5-7.

National Council on Community Foundations. St. Paul, Minn. May 11-12.

National Council on Crime and Delinquency. Atlantic City, N. J. May 21-24.

National Council on the Aging. Conference of National Organizations. New York, N. Y. April 24.

National Dental Health Conference. Chicago, Ill. April 26-28.

National Health Forum. Waldorf Astoria Hotel, New York, N. Y. March 13-16.

National League for Nursing. Biennial Convention. Cleveland, Ohio. April 10-14.

National Multiple Sclerosis Society. New York, N. Y. March 7.

National Social Welfare Assembly (Spring Meeting). New York, N. Y. April 18.

National Society for Crippled Children and Adults. Chicago, Ill. May 22-25.

National Society for the Prevention of Blindness. New York, N. Y. April 12-14.

National Tuberculosis Association. Netherland-Hilton Hotel, Cincinnati, Ohio. May 21-26.

President's Committee on Employment of the Physically Handicapped. Washington, D. C. April 27-28.

Purdue Industrial Waste Conference. Purdue Memorial Center, Lafayette, Ind. May 2-4.

Royal Society of Health Congress. Blackpool, England. April 24-28.

Southwestern Conference on Diseases in Nature Transmissible to Man. Memorial Student Center, Agricultural and Mechanical College of Texas, College Station, Tex. April 27-28.

Venereal Disease Symposium. Hotel New Yorker, New York, N. Y. April 13-14.

World Congress of Psychiatry. Montreal, Canada. June 4-10.

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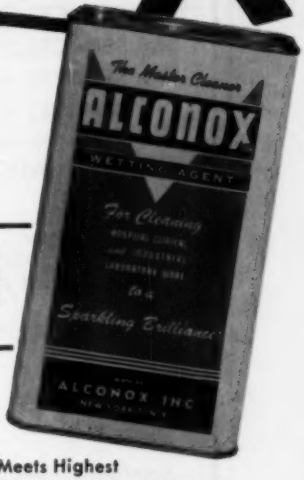

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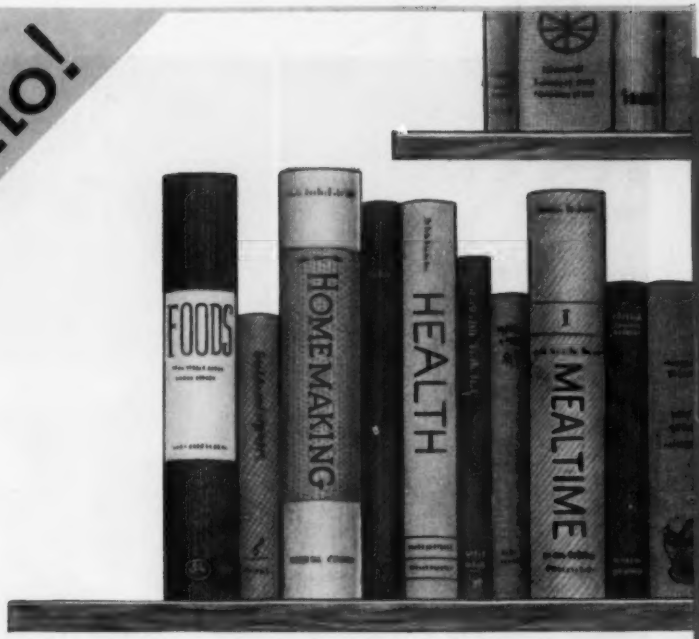

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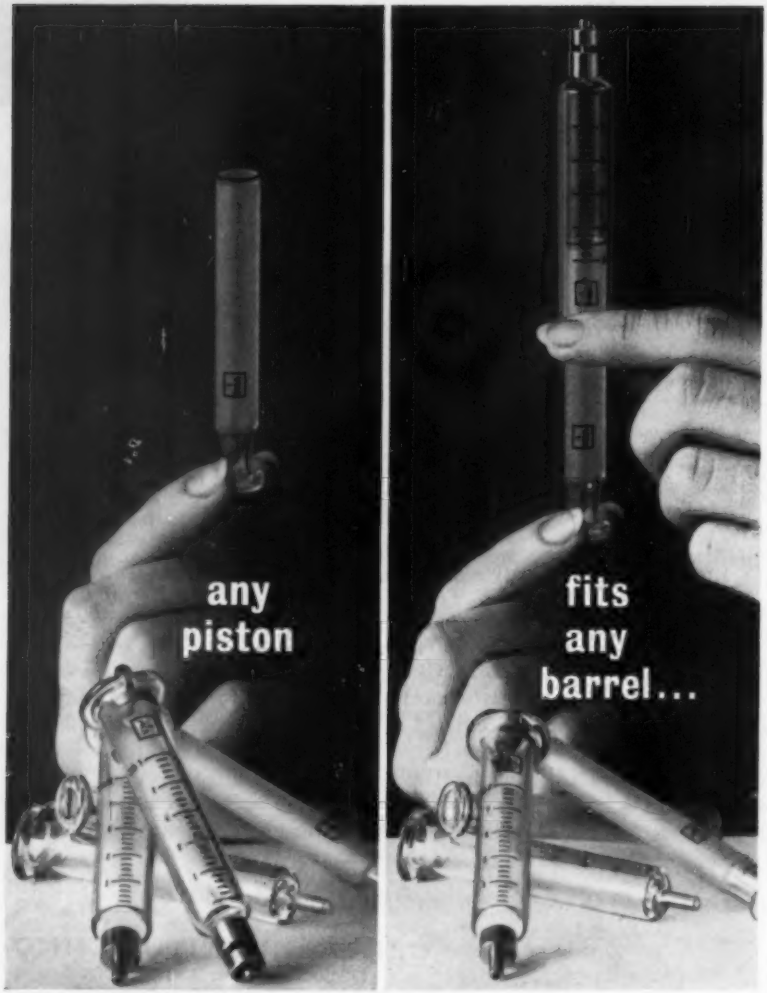

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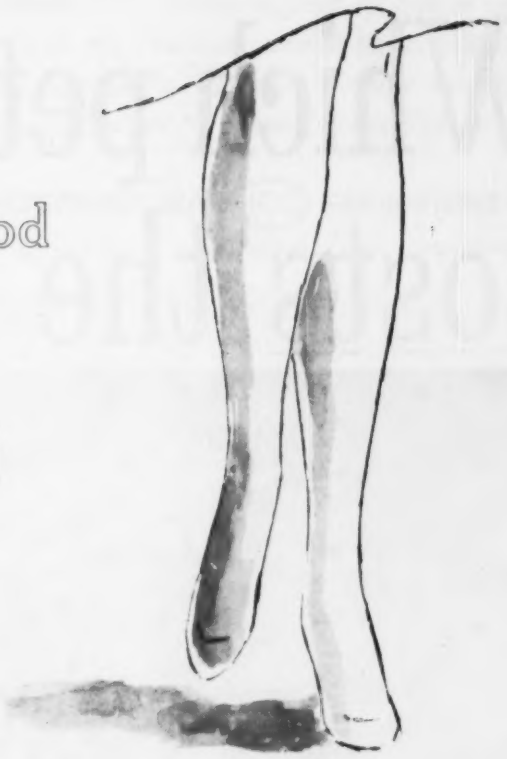

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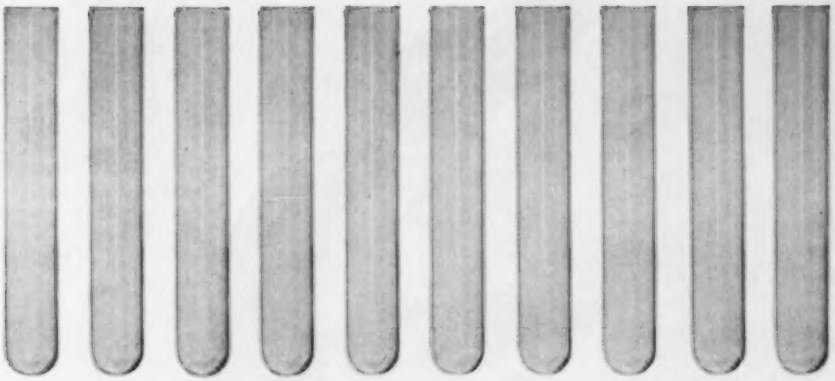

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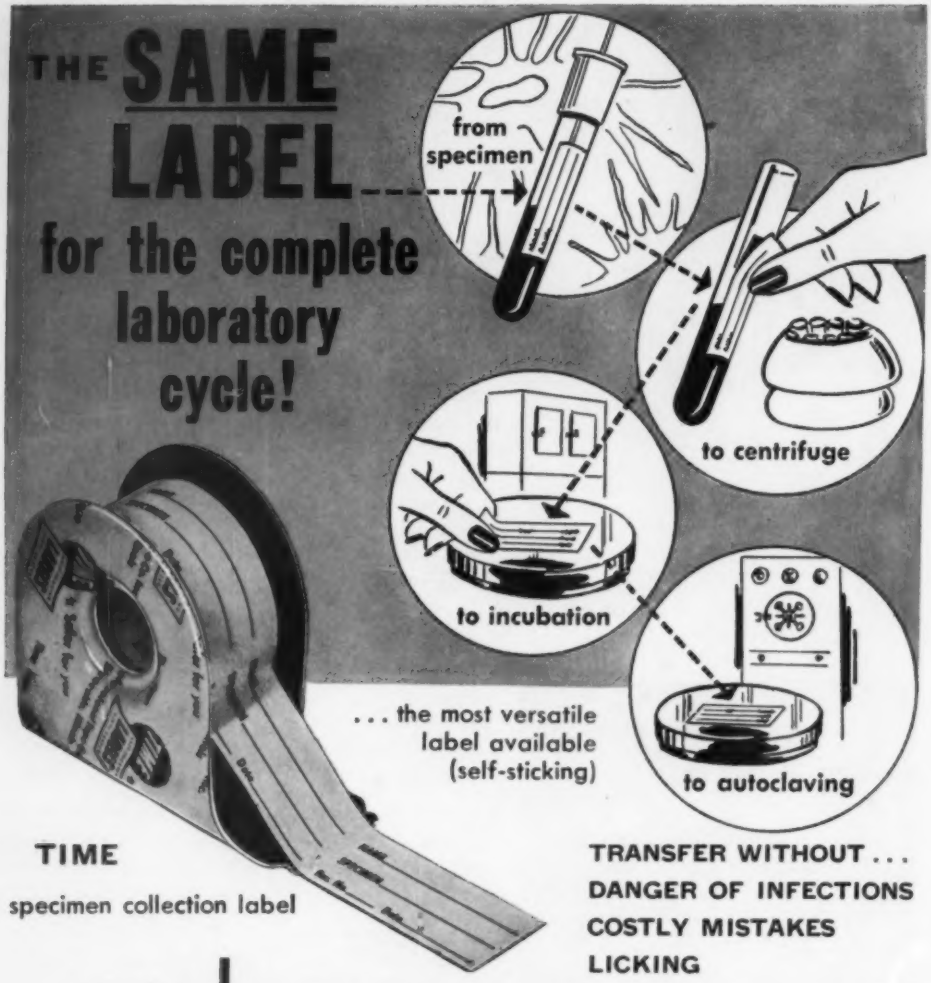

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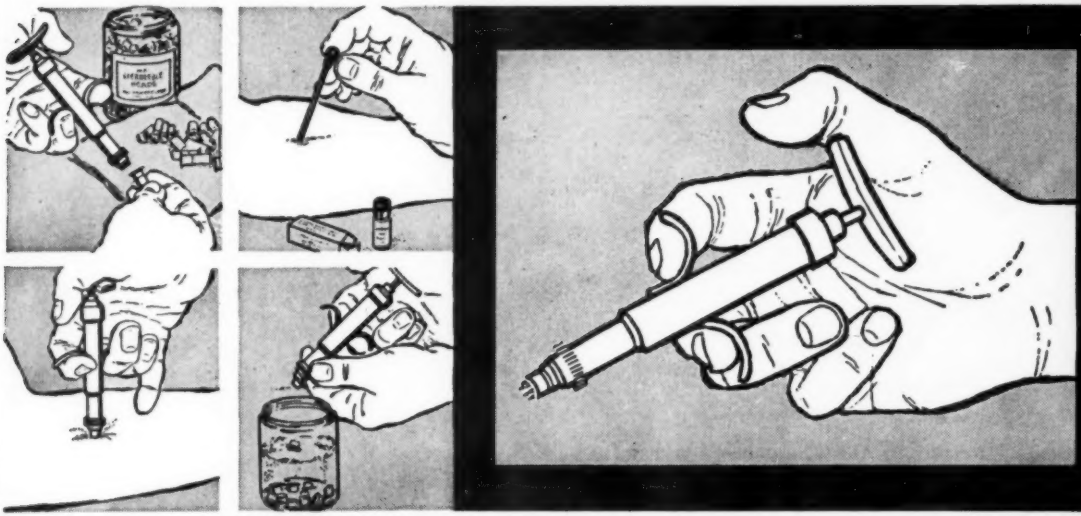

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ANN ARBOR MICH

DIFCO

preferred media
for isolation and differentiation
of

ENTERIC PATHOGENS

SALMONELLA—SHIGELLA

Isolation

Bacto-S S Agar
Bacto-MacConkey Agar
Bacto-Bismuth Sulfite Agar
Bacto-Brilliant Green Agar
Bacto-Selenite Broth
Bacto-Tetrathionate Broth Base

Differentiation

Bacto-Triple Sugar Iron Agar
Bacto-S I M Medium
Bacto-Purple Broth Base
Bacto-Purple Agar Base
Bacto-Urea Broth
Bacto-Urea Agar Base

ENTEROCOCCI

Bacto-Azide Dextrose Broth
Bacto-Azide Blood Agar Base
Bacto-S F Medium
Bacto-Phenylethanol Agar
Bacto-Enterococci Presumptive Broth
Bacto-Enterococci Confirmatory Broth
Bacto-Enterococci Confirmatory Agar

ENDAMOEBA HISTOLYTICA

Bacto-Endamoeba Medium
with Bacto-Horse Serum and Bacto-Rice Powder

THE DIFCO MANUAL, *NINTH EDITION,*
including descriptions of these media and their use, is available on request.

Specify DIFCO—the trade name of the pioneers in the research and development of Bacto-Peptone and Dehydrated Culture Media

DIFCO LABORATORIES
DETROIT 1, MICHIGAN